Canovision 8

SERVICE MANUAL

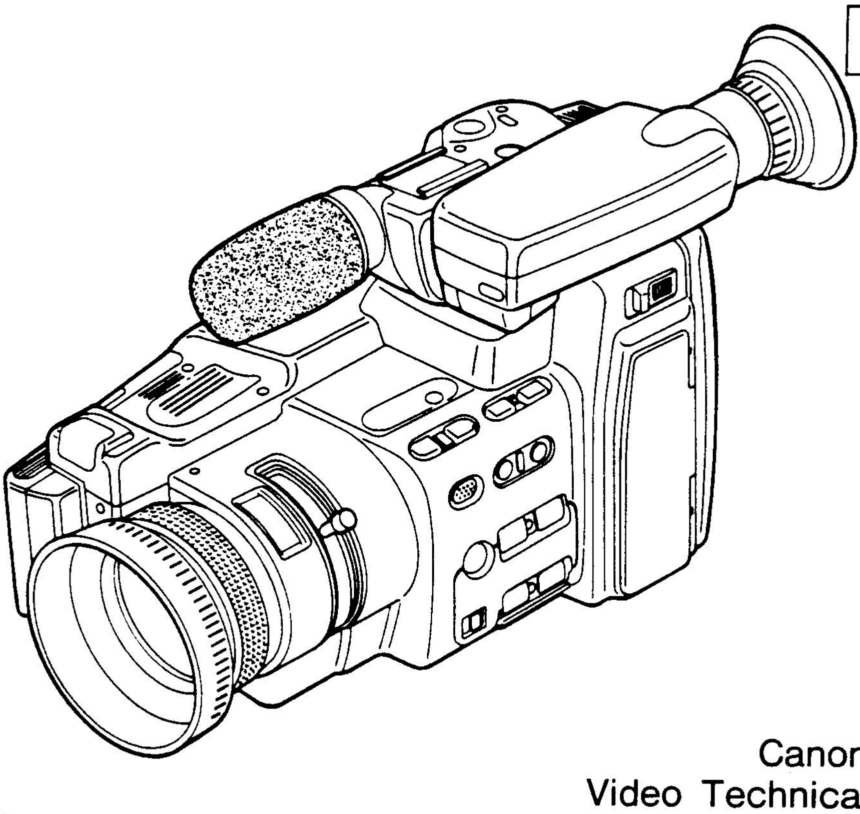
A1E,F

(REF.NO.D15-1530,1570)

8mm Video Camera & Recorder

PAL

SECAM



DY8-1151-530-000

© CANON INC. 1989

Canon Inc.
Video Technical Service Dept.
First Edition: Jun. 1989
Printed in Japan

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine CANON replacement parts.
   Especially critcal parts in the power circuit block should not be replaced with other makes.
   Critical parts are marked with ⚠ in the schematic diagrams.
2. The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in the viewfinder is especially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be same type as the original, CANON approved one.
3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been oberheated or damaged by the short circuit.
4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

5-1 Leakage Current Cold Check

1) Unplug the AC cord and connect a jumper between the two prongs on the plug.
2) Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metalic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metalic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ. When the exposed metal does not have a return path to the chassis, the reading must be ∞.

5-2 Leakage Current Hot Check

1) Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2) Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metalic parts on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3) Use an AC voltmeter, with 1000Ω volt or more sensitivity, to measure the potential across the resistor.
4) Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet. Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5) Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6) The potential at any point should not exceed 0.75V RMS.
   A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks.
   Leakage current must not exceed 0.5 milliamp.
   In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

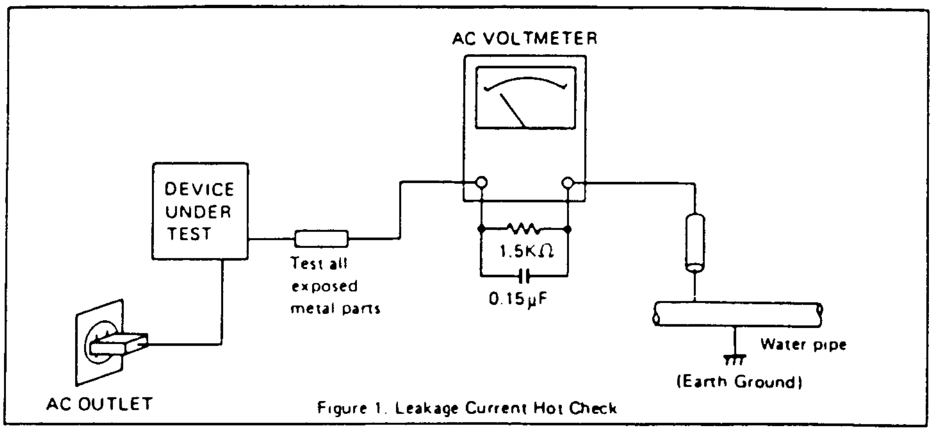


Figure 1. Leakage Current Hot Check

CONTENTS OF TABLE

Table No.	Title	Page
I-1	Performance comparison of white balance	I −20
I-2	Audio frequency format	I −21
I-3	Focus motor speed	I −25
I-4	Terminal functions of camera microcomputer (IC2403)	I −30, 31, 32 (3 sheets)
I-5	Terminal functions of servo microcomputer (IC101)	I −37, 38, 39 (3 sheets)
I-6	Terminal functions of main microcomputer (IC001)	I −40, 41, 42 (3 sheets)
I-7	Trouble stop (error) detection	I −48
II-1	FAWB adjustment mode (1)	II −25, 26 (2 sheets)
II-2	FAWB adjustment mode (2)	II −28, 29 (2 sheets)

CONTENTS

Note: For further details, refer to each chapters.

CHAPTER I. GENERAL DESCRIPTION OF PRODUCT

1. Product Overview .... I−1
2. New Technologies .... I−18
3. Circuit Description .... I−23

CHAPTER II. DISASSEMBLING/ADJUSTMENTS

1. Before Disassembling/Adjusting .... II−1
2. Disassembling .... II−10
3. Adjusting the Lens Section .... II−16
4. Electrical Adjustments of Camera Section .... II−19
5. Electrical Adjustments of Recorder Section .... II−31
6. EVF Adjustment .... II−36
7. Mechanical Adjustment of Recorder Section .... II−37

CHAPTER III. PARTS CATALOG

1. Exploded Views .... III−1
2. Electrical Parts List .... III−15
3. Parts List .... III−20

CHAPTER IV. DIAGRAM

1. Interconnection Diagram .... IV−1
2. Block Diagrams .... IV−2
3. Circuit Board/Schematic Diagrams .... IV−5

CONTENTS

CHAPTER I. GENERAL DESCRIPTION OF PRODUCT

1. Product Overview

1-1 Major features .... I−1
1-2 Specifications .... I−1
1-2-1 General .... I−1
1-2-2 Lens section .... I−2
1-2-3 Camera section .... I−2
1-2-4 Electronic viewfinder section .... I−2
1-2-5 Recorder section .... I−3
1-3 Nomenclature .... I−5
1-4 Brief description of control buttons, terminals and external parts .... I−9
1-5 Information display on electronic viewfinder .... I−16
1-6 A1 system chart .... I−17

2. New Technologies

2-1 Lens section .... I−18
2-1-1 Optics .... I−18
2-1-2 Piezoelectric auto focus .... I−18
2-2 Camera section .... I−20
2-2-1 Advanced Automatic White Balance (A^2 WB) .... I−20
2-3 Recorder section .... I−21
2-3-1 FM stereo audio function .... I−21

3. Circuit Description

3-1 Lens section .... I−23
3-1-1 Auto focus system .... I−23
3-1-2 AF circuit .... I−23
3-2 Camera section .... I−26
3-2-1 Power supply circuit .... I−26
3-2-2 CCD drive circuit .... I−27
3-2-3 Processing circuit .... I−27
3-2-4 Terminal functions of camera microcomputer (IC2403) .... I−30
3-2-5 Communication sequence between camera microcomputer and E^2 PROM .... I−32
3-3 Recorder section .... I−33
3-3-1 System control circuit .... I−33
3-3-2 Servo circuit .... I−50
3-3-3 Video circuit .... I−52
3-3-4 Audio circuit .... I−58

CHAPTER I. GENERAL DESCRIPTION OF PRODUCT

1. Product Overview

The Model A1 is a video camcorder born of CANON's leading-edge technologies and prestigious expertise. This most-advanced, full-featured product is oriented for the sophisticated nonprofessional and professional video camera users demanding excellence in functionality, picture quality, sound fidelity and portability.

1-1 Major features

1) Superb picture quality and sound fidelity
   - ° High-performance 10x zoom lens mounted
   - ° Hi-Fi FM stereophonic sound recording (with the stereo-sound microphone) for reproduction of realistic sound effect

2) Automated high-performability
   - ° Piezoelectric auto-focusing suitable for high-magnification zooming capability
   - ° Advanced auto white balance features
     Microcomputer-controlled AWB function combining advantages of sensor and TTL methods.

3) Improved portability and ease of use
   - ° Dual action grips
     The side and body grips are available; the side grip is suitable for long-time shooting, and the body grip is helpful for snap or telephoto-end shooting.
   - ° Tilted layout of recorder section
     Horizontal weight well balanced to let the user take pictures in stable state.
   - ° Electronic viewfinder rotatable through 180°
     Convenient for low-angle shooting and storing.

4) Pleasure-to-use functions
   - ° Three-mode timer recording
     Program timer incorproated as well as self-timer and interval timer
   - ° Noise-free fine still, frame advance and slow playback with the double-azimuth three-head rotating drum
   - ° Linear time counting in increments of seconds
   - ° Facilitated support for editing system
   - ° Digital manual iris mechanism with AE lock function
   - ° Four high-speed shutter rates selectable; 1/2000, 1/1000, 1/500 and 1/250 seconds

1-2 Specifications

1-2-1 General

Power supply	:	6 V DC
Power consumption	:	9.5 W or less (in fast-forward tape driving)
Weight	:	Approx. 1.5 kg (main unit only) Approx. 1.8 kg (main unit with battery pack BP-E718 and tape cassette)
Dimensions	:	157 (W) x 149 (H) x 257 (D) mm
Performance guarantee environment	:	0°C to 40°C, 85%RH or less
Operation guarantee environment	:	-5°C to 45°C, 60%RH or less
Signaling principle	:	PAL standard color video signaling

1-2-2 Lens section

Focal length	8 mm to 80 mm, zoom ratio ... 10x
Aperture ratio	1:1.4 (F1.7 at telephoto end)
Lens configuration	14 elements in 12 groups
Angle of view	Diagonal ..... 53°10' to 5°45' Horizontal ... 43°35' to 4°35' Vertical ..... 33°25' to 3°25'
Closest focusable distance	1.1 m
Zooming	Power zooming (approx. ten seconds telephoto, angle-end (-) wide angle end) Manual zooming selectable
Macro facilities	Wide-angle lensing
Macro shot distance	Up to 4 mm (from the top of front lens)
Filter thread diameter	55 mm (P = 0.75)
Aperture control	Auto iris servo-control (five blades)
Auto focus principle	Piezoelectric auto-focusing Focus zone selectable; Two-stage rangefinding
Auto-focus working distance	1.1 m to infinity
Auto-focus working illumination	50 to 100,000 Lux
Auto-focus response speed	Approx. four seconds (Closest focusable distance to 2.4 m; infinity to 2.4 m)
Auto-focus mode selection	Continuous auto-focusing or manual focusing selectable with a click of ON/OFF button

1-2-3 Camera section

Image pickup device	1/2-inch CCD solid-state imaging device, with 400,000 pixels
Spatial modulation frequency	6.44 MHz
Color separation	Color difference line sequential processing
Synchronization	Internal synchronization
Scanning	625 scanning lines; 50 fields per 25 frames
Minimum subject illumination	7 Lux
Subject illumination range	7 Lux to 100,000 Lux
White balance	Advanced AWB control (with sensor and TTL function)
White balance adjustable range	Approx. 2800°K to 10000°K
Exposure correction	Digital manual iris adjustment (Full opening/closing of iris allowed) With automatic exposure lock function
Fading	White fading with video-audio synchronization (approx. four seconds) Date/time indication unaffected by fading

1-2-4 Electronic viewfinder section

Type	Electronic viewfinder of rotating retraction type
Angle adjustment	Viewing angle adjustable through 90° upward Rotatable through 180° in retracted position
Built-in monitor (CRT)	0.7-inch monochrome monitor
Resolution of monitor (CRT)	Approx. 220 scanning lines (for camera EE)
On-viewfinder indication	Alphanumeric characters
Visual field ratio	Approx. 90% (with respect to full-scan monitor)
Eyepiece	Sports Finder SF-100
Diopter adjustable range	+1 to -5.0 Diopter
Eye point	20 mm (eye on eyecup) 72 mm (distance from eyecup, using one eye) with no vignetting

1-2-5 Recorder section

Audio input : Input impedance
External microphone ..... 6 kilohms or more (stereo mini-jack)
Signal level
External microphone ..... -64 dBV (600 ohms)

Video output : Output impedance .... 75 ohms
Signal level
Line output .... 1 Vp-p
Luminance signal to noise ratio .... 43 dB maximum
Chrominance signal to noise ratio .... 40 dB maximum
Horizontal resolution ..... 230 or more TV lines (VTR output at center area)
400 or more TV lines (camera line output at center area)

Audio output : Output impedance
Line output .... 3 kilohms or less
Earphone output .... 16 ohms
Signal level
Line output .... -10 dBV
Audio signal to noise ratio
Microphone input .... 40 dB

Recording principle : Rotary three-head, helical scanning, azimuth recording
Conforming to 8 mm video standards
Video signal
Luminance signal .... Frequency modulation
Chrominance signal .... Frequency down-conversion
Audio signal .... FM stereo audio signal recording
Tracking .... Four-frequency pilot tracking (ATF)

Tape speed : 20.051 mm/sec. (in SP mode)
10.0255 mm/sec. (in LP mode)

Quantity of heads : Video head .... 3 pieces (double-azimuth three-head design)
Erase head .... 1 piece (flying head)

Recording/playback time : 90 minutes (for use with P5-90)

Applicable tape : 8 mm video cassette tape
Kind of tapes .... Metal-particle tape (MP)
Tape thickness .... 13 µm, 10 µm

Recording functions : Camera video recording
Timer video recording
1) Self-timer recording
(SELF) .... Recording is started after a pause of approx. ten seconds.
(SELF 30) .... Recording is performed for approx. 30 seconds after the self-timer is turned on.

2) Interval-timer recording

(INT.10) .... Recording for duration of 0.5 second is repeated at an interval of 10 seconds.

(INT.20) .... Recording for duration of 0.5 second is repeated at an interval of 20 seconds.

(INT.60) .... Recording for duration of 0.5 second is repeated at an interval of 60 seconds.

3) Program-timer recording

Recording start time is programmable within a time span of 24 hours.

Playback functions : Standard playback

Special playback

Video-only playback

Still picture playback .. Field still (fine still) playback with double-azimuth three-head reading

Fast-forward playback ... Approx. 9x fast motion (with noise bar position fixed)

Reverse playback .... Approx. 7x fast motion (with noise bar position fixed)

Frame-advance playback .. Possible

Slow playback .... Approx. 1/5 slow motion (continuous frame-advance playback)

Other features : Auto date indication

Current time and calendar date are displayable on viewfinder screen and recordable on tape; can be turned off.

Span of internal calendar ..... From 1 January, 1989
to 31 December, 2010

Title recording

Impose-recording with the built-in title (character) generator

Recording search

In the recording pause state, forward/reverse playback is allowed using the recording search button(+/-).

Record review

In the recording pause state, one push of the recording search button (-) reproduces immediately the preceding recording for approx. three seconds.

Tape counter

Linear time counter; automatically reset when the tape cassette is loaded.

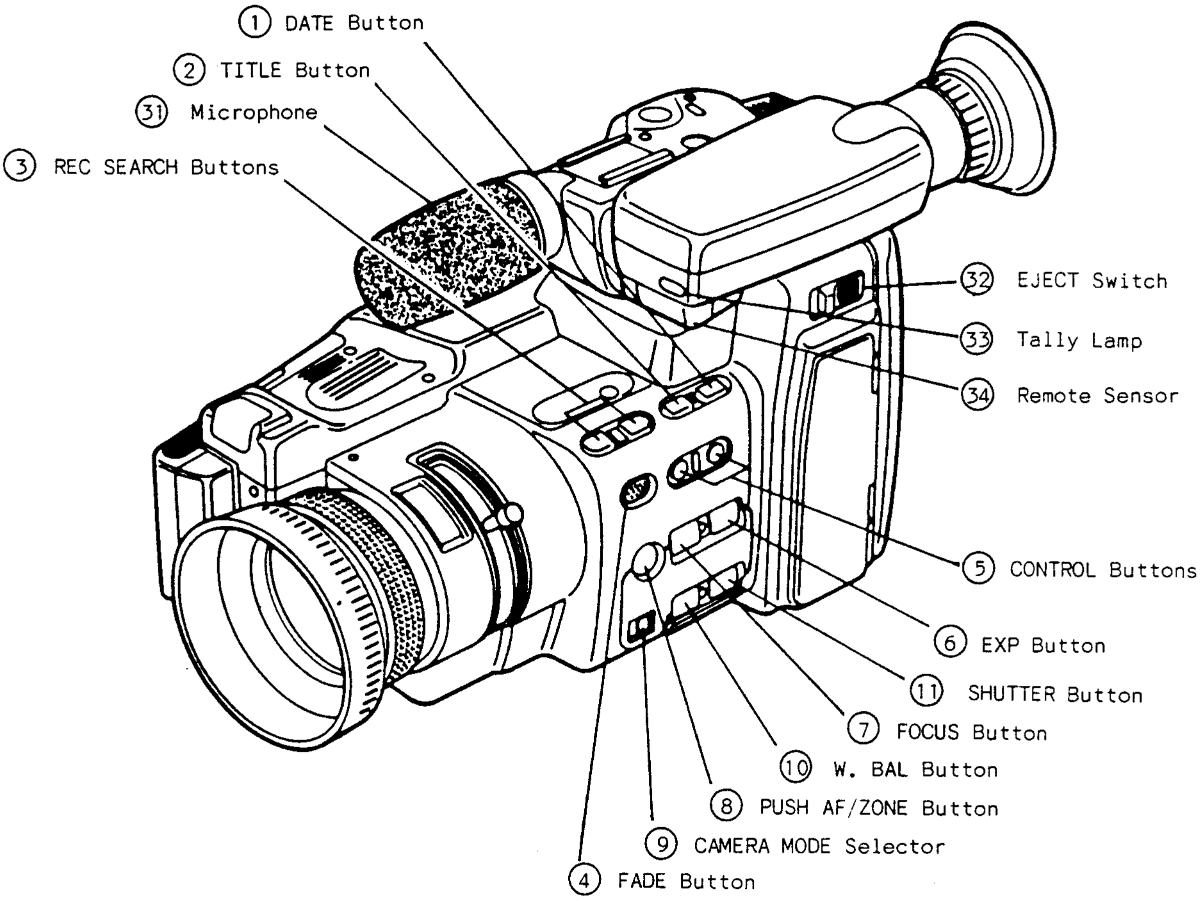
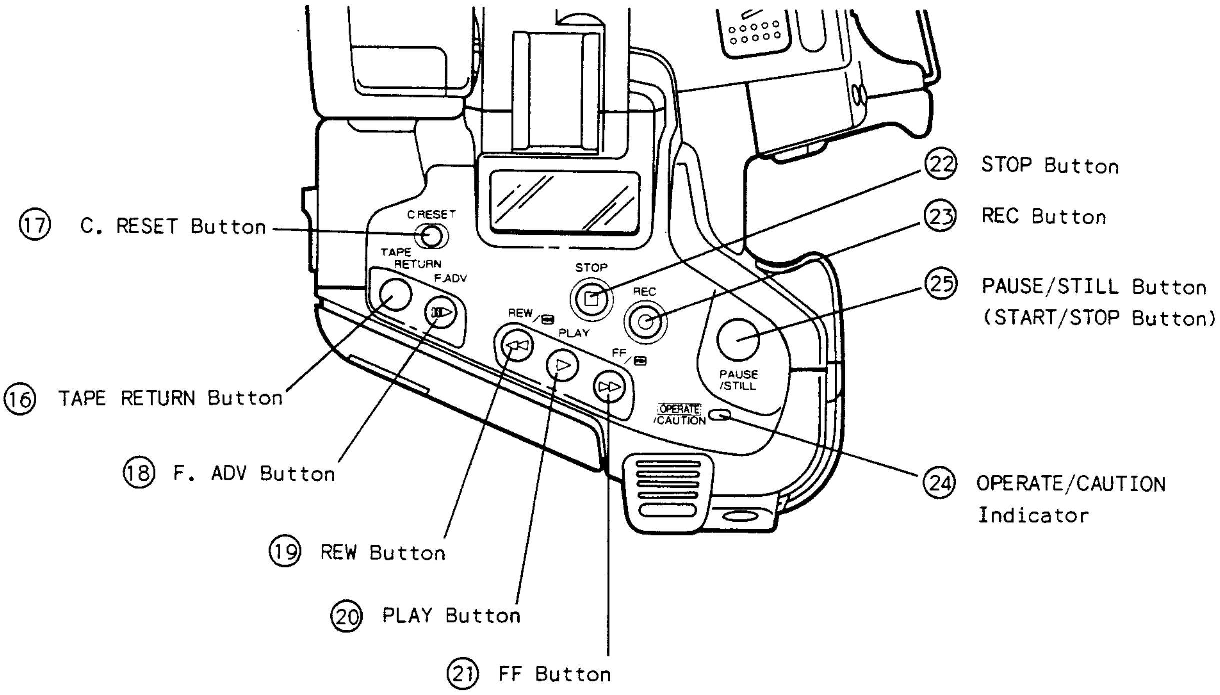

① DATE Button
② TITLE Button
㉛ Microphone
③ REC SEARCH Buttons
㉜ EJECT Switch
㉝ Tally Lamp
㉞ Remote Sensor
⑤ CONTROL Buttons
⑥ EXP Button
⑪ SHUTTER Button
⑦ FOCUS Button
⑩ W. BAL Button
⑧ PUSH AF/ZONE Button
⑨ CAMERA MODE Selector
④ FADE Button

Fig. I-1

A1F


⑰ C. RESET Button
⑯ TAPE RETURN Button
⑱ F. ADV Button
⑲ REW Button
⑳ PLAY Button
㉑ FF Button
㉒ STOP Button
㉓ REC Button
㉕ PAUSE/STILL Button
(START/STOP Button)
㉔ OPERATE/CAUTION
Indicator
C.RESET
TAPE
RETURN
F.ADV
STOP
REC
REW
PLAY
FF
PAUSE
/STILL
OPERATE
/CAUTION

A1E

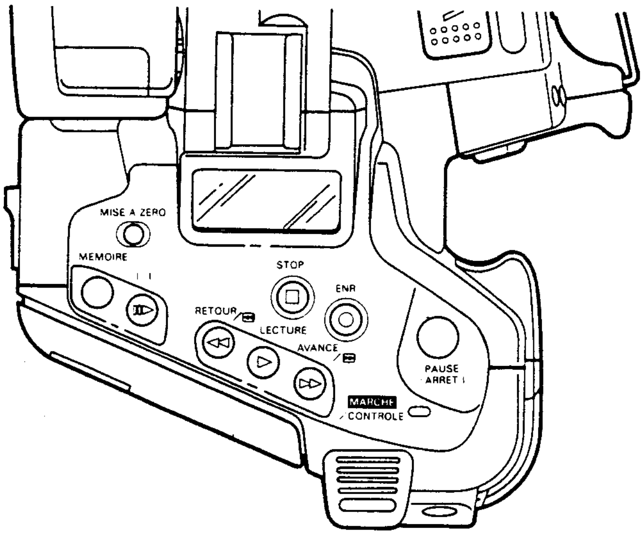
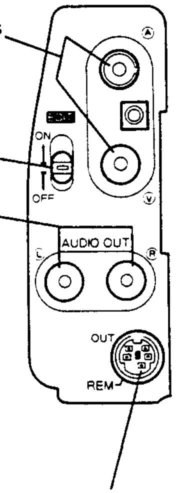

MISE A ZERO
MEMOIRE
STOP
ENR
RETOUR
LECTURE
AVANCE
PAUSE
ARRET
MARCHE
/CONTROLE

Fig. I-2

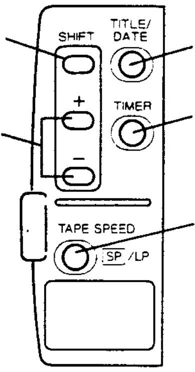
A1E

° Inside the Audio/Video Compartment

° Inside the Rear Compartment



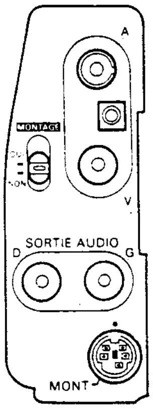
⑫ Audio/Video Outputs
⑬ EDIT Switch Normally, set to OFF position
⑭ Stereo AUDIO OUT Terminals
A
EDIT
ON
OFF
V
AUDIO OUT
L
R
OUT
REM



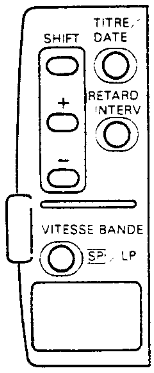
㉖ SHIFT button
㉗ +/- Buttons
㉚ TITLE/DATE Button
㉙ TIMER Button
㉘ TAPE SPEED Button
SHIFT
TITLE/ DATE
+
−
TIMER
TAPE SPEED
SP/LP

⑮ REM (Remote) Terminal
This terminal, located in the Audio/Video Compartment, is provided to connect the camera to commercially available products that have an editing feature and a CONTROL L terminal. Refer to other product's instruction manual for details.

A1F



A
MONTAGE
V
SORTIE AUDIO
D
G
MONT



SHIFT
TITRE/ DATE
+
−
RETARD INTERV
VITESSE BANDE
SP/LP

Fig. I-3

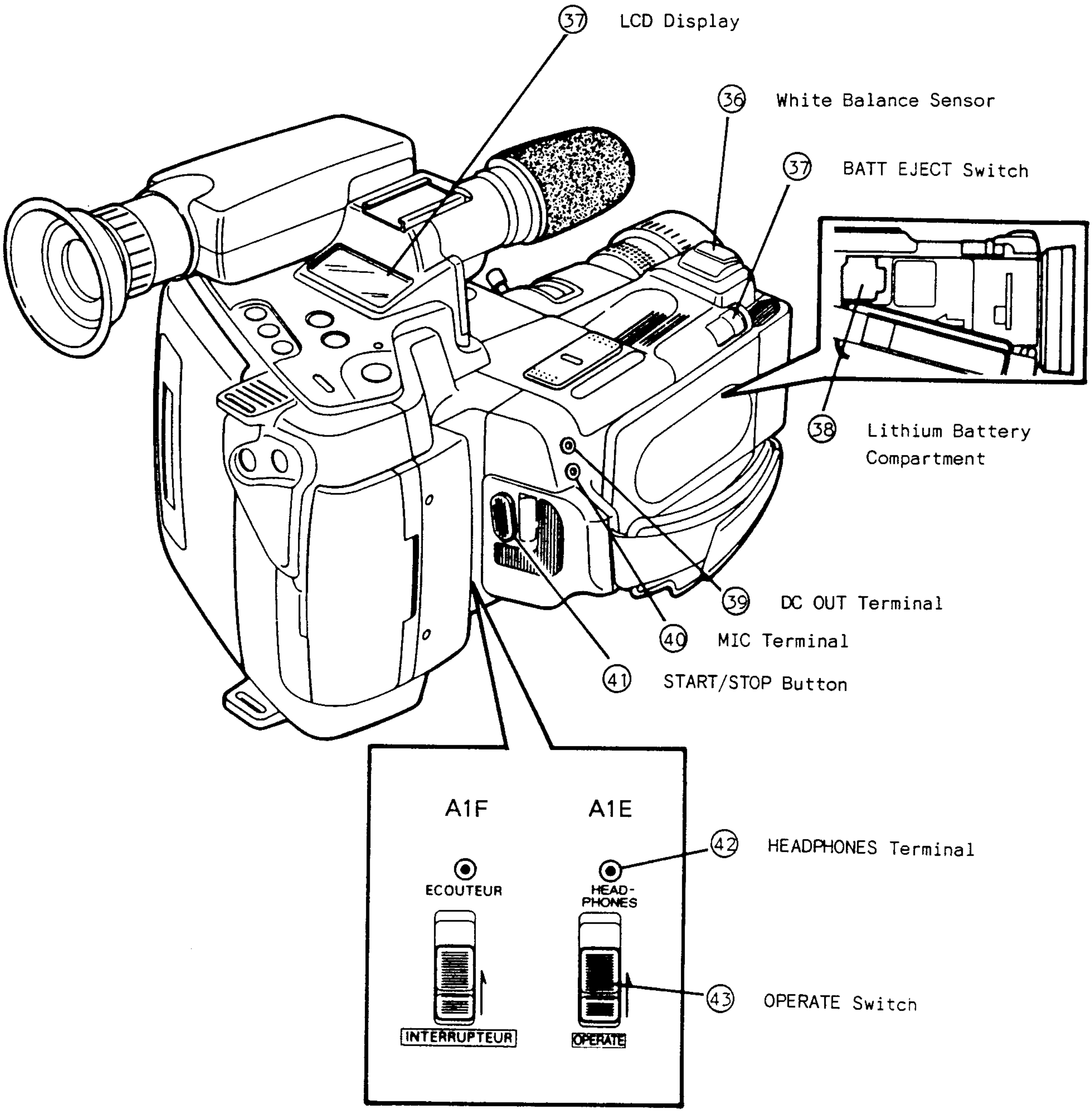

㊲ LCD Display
㊱ White Balance Sensor
㊲ BATT EJECT Switch
㊳ Lithium Battery Compartment
㊴ DC OUT Terminal
㊵ MIC Terminal
㊶ START/STOP Button
A1F
A1E
ECOUTEUR
HEAD-PHONES
INTERRUPTEUR
OPERATE
㊷ HEADPHONES Terminal
㊸ OPERATE Switch

Fig. I-4

1-4 Brief description of control buttons, terminals and external parts

(Right side face)

① Date button
Date display button in the camera mode presents the data/time indication on the viewfinder screen. In the camera recording, the date/time can be imposed on pictures.

Date/time not displayed (At power-on)	⇨	1. JAN '89 (Only date displayed)	⇨	Date/time not displayed	⇨	AM12:34 (Only time displayed)	⇨	Date/time not displayed	⇨	1. JAN '89 AM12:34 (Date and time displayed)

② Title button (TITLE)
Pressing this button in the camera mode presents the memorized title on the viewfinder screen. In the camera recording, the user-created title can be imposed on pictures.

③ Record search button (REC SEARCH)
In the camera recording pause state, while the recording search button (+)/(-) is being held down, the tape is fed/rewound to reproduce the recorded images in forward/backward direction on the viewfinder screen. Thus, the user can locate the cue position of tape without having to change over to the playback mode. When the minus button (-) is pressed once, the previous recording for approx. three seconds is played back to allow the user to check it. Then, the tape is returned to the pause-requested position and the machine is set to the recording pause state.

④ Fade button (FADE)
When this button is pressed and held on, the image and sound disappear gradually (fading-out). Then, this button is released, they appear gradually (fading-in). The white fading function is employed in Model A1, and it is not interlinked with the trigger button.

⑤ Exposure adjust button (ADJ)
In the camera mode, the user can manually adjust exposure level. The aperture (iris) opens/closes gradually while the plus/minus button (+)/(-) is pressed in the manual exposure state. When it is released, the iris is locked and the manually adjusted exposure level is indicated on the viewfinder screen.

⑥ Exposure button (EXPOSURE)
In the camera mode, each press of this button toggles between the auto iris state and the manual iris state. When the manual iris operation is selected, the exposure level is indicated on the viewfinder screen. This indication is not reset by turning on/off the power switch. But, it is reset when the camera mode selector is activated for programming.

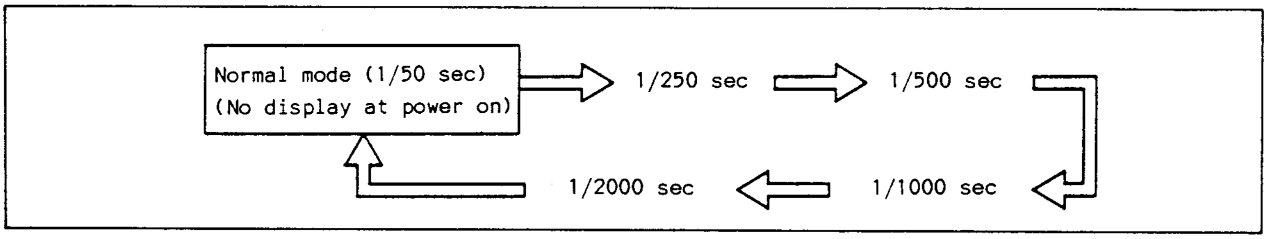
⑦ Focus button (FOCUS)
In the camera mode, each press of this button toggles between the auto focus state and the manual focus state. When the auto focus state is selected, the AF zone is displayed on the viewfinder screen.

⑧ One-shot/zone button
In the camera mode, the extent of AF zone is adjusted during the auto focus operation. During the manual focus operation, pressing this button activates the one-shot focus function. (A click of this button makes the auto focus function active for four seconds. If this button is held down for more than four seconds and the released, the auto focus function is made inactive regardless of whether the image is in focus or not.)

⑨ Camera mode selector (CAMERA MODE)
In the camera mode, when the A (auto) position is selected, such control functions as white balance, focus adjustment, high-speed shutter and exposure functions are put in fully automatic state. When the M (manual) position is selected, these control functions are adjusted according to the user settings to allow shooting at his or her discretion. The user settings are retained in memory even if the power switch is turned off. Note, however, that the user settings are reset when the power supply is removed and the auto mode is assumed when it is attached again.

⑩ White balance button (WHITE BALANCE)
In the camera mode, each press of this button toggles between the full auto white balance state and the white balance setup state. When the white balance setup state is selected, the message "WB SET" is displayed on the viewfinder.

⑪ Shutter button (SHUTTER)
In the camera mode, each press of this button changes the shutter speed to 1/250, 1/500, 1/1000 and 1/2000 sec (then to the normal speed) in a cyclic fashion as indicated below. The selected shutter speed is displayed on the viewfinder screen.



⑫ Audio/video output
Output terminals for audio/video signals. The RF unit is available where this machine is connected with the television receiver not equipped with the audio/video input terminal.

⑬ Edit switch (EDIT)
Used for editing of the recorded tape. Turn on this switch only when editing the tape with this machine connected for playback. Deterioration of the picture quality can be minimized by turning on this switch. In a common operation, turn it off.

⑭ Stereo sound output terminal (AUDIO OUT)
Used for outputting stereo sound.

⑮ Edit terminal (REM)
This terminal is convenient when editing with two video deck units (for extracting necessary scenes, changing the sequence of scenes, and so on). With the optional editing unit connected, the user can conduct such sophisticated editing easily.

⑯ Tape return button (TAPE RETURN)
Pressing this button in the stop mode rewinds the tape rapidly until the linear tape counter reaches (0:00:00) level. The linear tape counter is reset to (0:00:00) when the tape cassette is unloaded/loaded.

⑰ Counter reset button (C. RESET)
In any mode, pressing this button causes the linear tape counter to be reset to (0:00:00).

⑱ Frame advance button (F. ADV)
Pressing this button in the pause mode feeds the tape frame by frame. And, while it is held down, the slow-motion pictures are played back (1/5x slow motion).

⑲ Rewind button (REW/ ◀◀)
Pressing this button in the stop mode rewinds the tape. And, holding down this button in the playback mode reproduces the fast-motion pictures (7x fast motion). In the playback mode, releasing this button causes the machine to perform normal playback again. Also, if it is held down during tape rewinding, the pictures are reproduced backward rapidly as the tape goes back.

⑳ Playback button (PLAY)
In other than the recording mode, pressing this button starts playback operation.

㉑ Fast forward button (FF/ ▶▶)
Pressing this button in the pause state causes the tape to be fed fast. If it is held down during playback, the pictures are reproduced forward rapidly (at a speed of 9x fast motion). When it is released, the machine resumes normal playback operation. Also, if this button is held down for fast-forward operation, the fast-forward playback operation is continued.

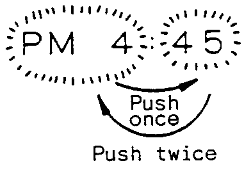
㉒ Stop button (STOP)
Pressing this button causes tape drive to stop.

㉓ Recording button (REC)
When this button is pressed in the stop state or still playback mode, the machine is put in the recording pause mode.

㉔ Operate/warning indicator lamp (OPERATE /CAUTION)
When the machine condition is normal, this indicator lamp lights up by pressing the power switch. It blinks if any irregularity (e.g. low voltage of battery) takes place.

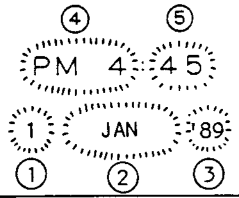
㉕ Pause/still button (PAUSE/STILL)
Pressing this button during playback causes the machine to go to the still playback mode. When this button is pressed in the still playback mode, the machine gets back to the normal playback mode. Also, pressing it during recording sets up the recording pause state. And, when it is pressed in the recording pause state, the machine resumes recording operation.

㉖ Shift button (SHIFT)
° Usable for setting the timer recording operation (up to 24 hours).
When this button is pressed after determining 'hours', the item is shiftted to 'minutes'.



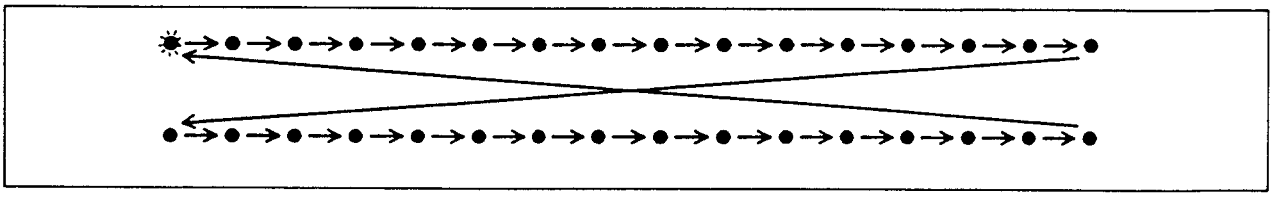
* Displayed both in EVF and Crystal Display Screen.

° Used for setting the auto date function (year, month, day, hours, minutes). Each press of this button shifts the prompt from 'year' to 'month', 'day', 'hours' and 'minutes'.



⑥ all indication lights up.

° Usable to shifting the character position of title (16 characters on 2 lines).



㉗ Plus/minus button (+/-)

° Any start time can be set for the timer recording operation.

PM4 : 45

① ②

① AM1 <----> AM11 · PM12 · PM1 <----> PM11 · AM12

② 01 · 02 · 03 <----------> 58 · 59 · 00

° Any setting is allowed for the auto date function (year, month, day, hours, minutes).

PM4 : 45

④ ⑤

1. JAN '89

① ② ③

① 1·2·3·4 <----------> 29·30·31

② JAN, FEB (FEV) <----------> NOV, DEC

③ '89, '90 <----------> '09, '10

④ ⑤ the same as in timer recording Note ( ) ... A1F display

° Usable for selection of an alphanumeric character/special symbol in title.

ABC <----> XYZ 01 <----> 89. ./–' " : ;?! *&

By pressing the plus and minus buttons at the same time, 1) all the characters on the right can be deleted including the cursor, 2) a title cannot be created during the line input or recording. (The recording operation is not permitted when the line input is connected.) 3) Still frame picture/frame advance can be adjusted.

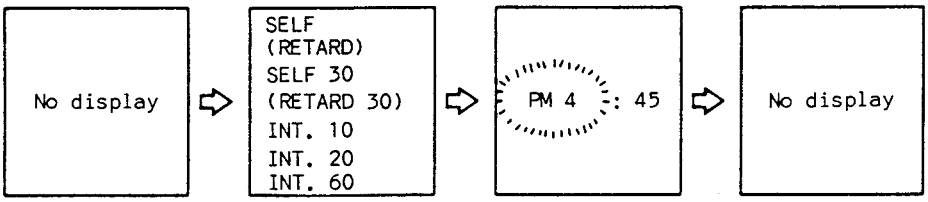
㉘ Tape speed button (SP/LP)

SP or LP recording mode is selectable at REC PAUSE, FF, REW or STOP mode.

㉙ Timer button (TIMER)

When this button is pressed once in the recording pause state, the self-interval mode is selected. Then, to start the self-timer/interval operation, press the plus/minus button, select either 'SELF' or 'INTERVAL', and press the start/stop button.

The current time can be displayed by pressing this button twice. To adjust the timer indication, use the plus/minus button and the shift button. At the end of setting, press the start/stop button. This causes the machine power to turn off. The user can thus make timer recording reservation. (In this case, " 🕘 " mark is presented only on the liquid-crystal display.)

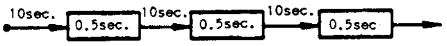
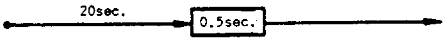
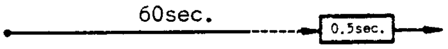

No display
SELF
(RETARD)
SELF 30
(RETARD 30)
INT. 10
INT. 20
INT. 60
PM 4 : 45
No display

Push once

Push twice

Push three times ... returned first state.

Note ( ) ... A1F display

SELF/INT.	Operation	Display in EVF screen	Display in Crystal display
※SELF	Rec. Pause	SELF 10 (RETARD 10)	10
		↓	↓
		SELF 1 (RETARD 1)	1
	Rec.		
※SELF 30	Rec. Pause	SELF 10 (RETARD 10)	10
		↓	↓
	Rec.	SELF 1 (RETARD 1) SELF 30 (RETARD 30)	1 30
		↓	↓
	Rec. Pause	SELF 1 (RETARD 1)	1
※INT. 10	 10sec. 0.5sec. 10sec. 0.5sec. 10sec. 0.5sec Rec.	INT.10	INT
※INT. 20	 20sec. 0.5sec. Rec.	INT.20	INT
※INT. 60	 60sec. 0.5sec. Rec.	INT.60	INT

Note ( ) ... A1F display

For cancellation, press the stop button, the start/stop button and the plus/minus button in the self/interval mode. Thus, the user can select any mode.

㉚ Title/date button (TITLE/DATE)
When this button is pressed once, the title mode is set up. To create a title, use the shift and plus/minus buttons. On completion of a title, press the title/date button again. This causes the blinking of title to cease. By this step, the created title is stored into memory.
To insert the title in recording, press the title button. If it is not desired to make the title disappear, press it again. (The user can check the title on the viewfinder screen.)

㉛ Microphone
Stereo directional microphone.

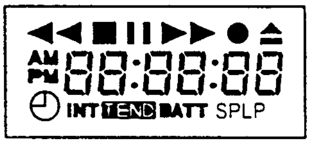
㉜ Eject switch (EJECT)
In other than the recording mode, pressing this switch eject the cassette tape.

㉝ Tally lamp
This lamp flashes during the camera recording operation or the self-timer operation. Also, it lights up when the remote control signal is received.

Rec. .... flashes at 1 Hz cycle
Self-timer waiting .... flashes, ON: 0.5 sec./OFF: 1.5 sec. cycles
Remote controller used ..... lights up

㉞ Remote sensor
The remote control signal is received through this window.
Light receiving angle : Approx. 30° at left/right
Approx. 15° at upper/lower
Remote-controllable distance: 5 meters

㉟ Liquid-crystal display
This display can provides the indications shown below. The linear time counter has a range of up to ±9:59:59.



㊱ White balance sensor
Color temperature sensors (red, blue) with externally measuring system is equipped.

㊲ Battery release siwtch
When taking the power supply from the battery box, slid this switch forward.

㊳ Lithium battery compartment
Contains the lithium battery for auto date function. The lithium battery has a service life of approx. one year.

㊴ DC output terminal
Used to provide power output for the optional stereo microphone.

㊵ MIC terminal
Used as power supply output terminal of the optional stereo microphone.

㊶ Start/stop button
Pressing this button in the recording pause state cause the machine to resume recording.
When this button is pressed again, the recording pause state is set up again.
This button is also usable to start/cancel the self/interval timer function.

㊷ Headphone terminal
Used for headphone output.

㊸ Operate switch
Used to turn power on/off.

1-5 Information display on electronic viewfinder

The electronic viewfinder in Model A1 lets the user readily know a repertoire of current statuses and data. It displays the camera operating status, recorder operating mode, warning message, AF rangefinding zone, etc. Still more, the user can select the normal display mode (auto date/title display) or the timer setting menu mode at a touch of the button.

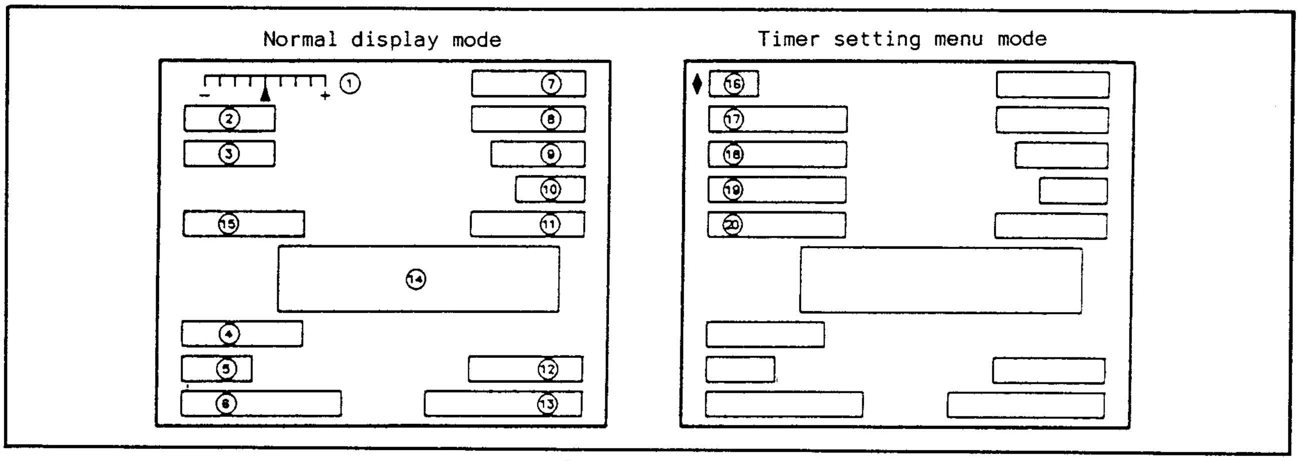


Fig. I-5

Note: ☐ : A1E display
⬚ : A1F display (Unless otherwise specified, the display is the same as A1E's.)

① Iris indication

② White balance indication
* WB SET
BAL. MAN.
Blinks during adjustment or when adjustment is disabled.

③ Electronic shutter speed indication
1/250
1/500
1/1000
1/2000

④ Timer mode indication
SELF
RETARD
SELF 30
RETARD 30
INT 10
INT 20
INT 60
The SELF timer is of a down-counting type.

⑤ SP/LP mode indication
SP

⑥ Main unit mode indication
REW
RETOUR
FF
AVANCE
PLAY
LECTURE
STILL
ARRET/I
REC PAUSE
PAUSE ENR
REC
ENR
STOP
* EJECT
*: Blinks on occurrence of an error.

⑦ Counter indication
4:45:00

⑧ Unloading-of-tape/end-of-tape indication
* CASSETTE
TAPE END
BANDE FINITE
*: Blinks for warning.

⑨ Low-battery-voltage warning indication
* BATTERY
BATTERIE
*: Blinks.

⑩ Dew condensation warning indication
* DEW
CONDENSTION
*: Blinks.

⑪ Low-lithium-voltage warning indication
* DATE BATT
BATT DATEUR
*: Blinks.

⑫ Time indication
PM 4:45
Hours:Minutes

⑬ Date indication
1. JAN '89
Day.Month.Year

⑭ Title indication
16 characters
16 characters
The displayable characters are as follows:
□ABC to XYZE□ 0123 to 789, ./-'":;?!*&

⑮ Timer recording indication

PM 4:45

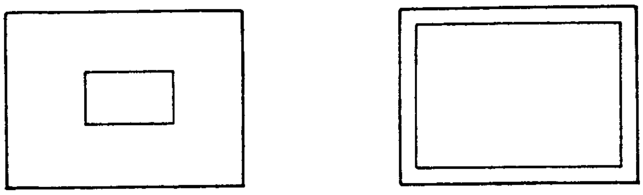
Displays when the timer recording mode is selected.

Timer setting menu (Select a menu item by moving ◆ mark.)

⑯ SELF
⑰ SELF 30
⑱ INT 10
⑲ INT 20
⑳ INT 60

When the mode selected through the menu is set up, the timer mode indication ④ appears on the viewfinder screen. If 'SELF' is selected, its indication is counted down as soon as the self-timer is started. When the timer recording operation is selected, its time indication ⑮ appears on the viewfinder screen.

AF rangefinding frame (zone) indication



*: The AF rangefinding frame on the viewfinder screen may flash or disappear depending on the luminance of subject or the level of video signal.
Too dark subject/too low video signal level:
The AF rangefinding frame flashes.
Too high luminance:
The AF rangefinding frame disappears.

1-6 A1 system chart

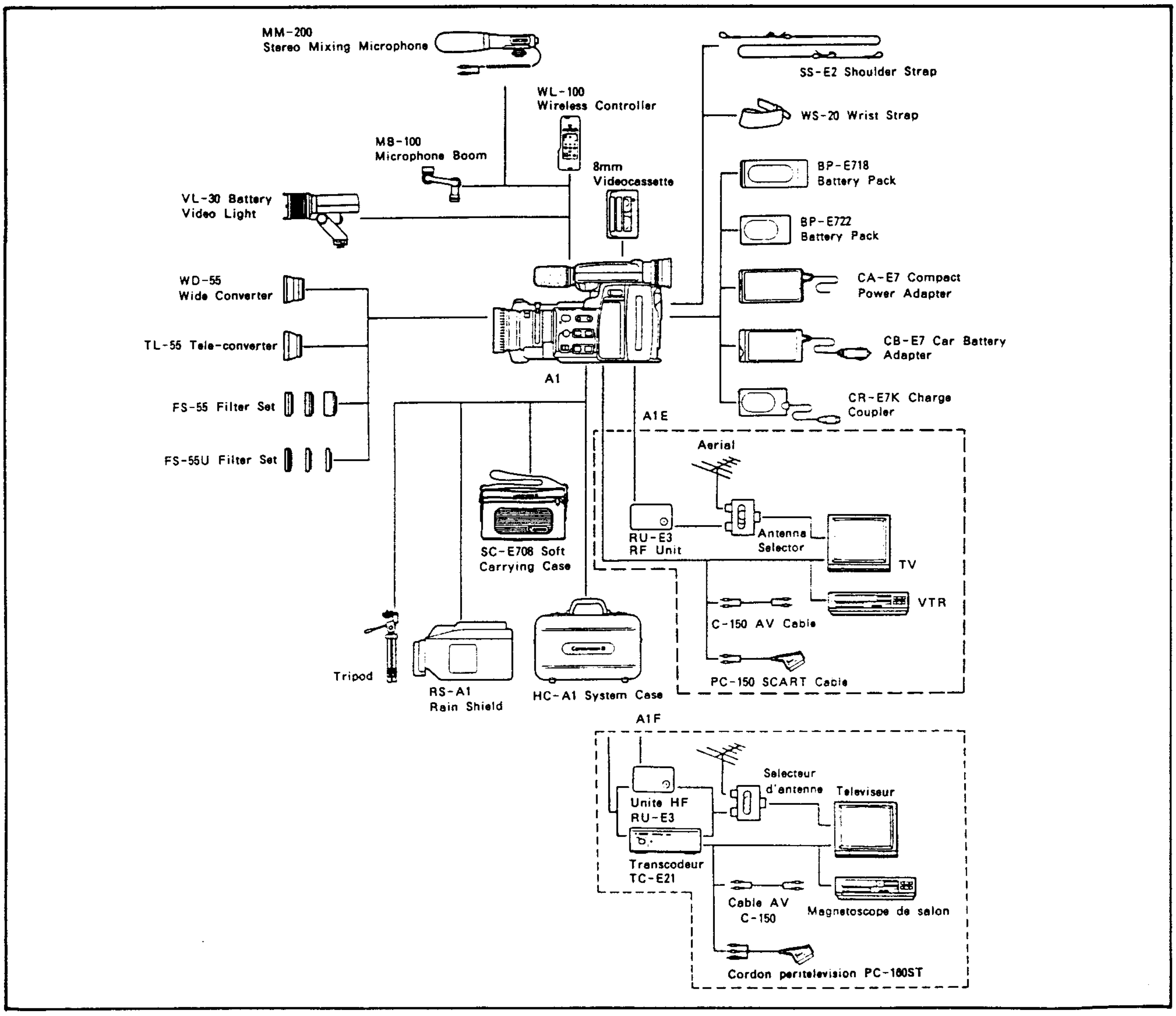

MM-200
Stereo Mixing Microphone
WL-100
Wireless Controller
MB-100
Microphone Boom
8mm
Videocassette
VL-30 Battery
Video Light
WD-55
Wide Converter
TL-55 Tele-converter
FS-55 Filter Set
FS-55U Filter Set
A1
SS-E2 Shoulder Strap
WS-20 Wrist Strap
BP-E718
Battery Pack
BP-E722
Battery Pack
CA-E7 Compact
Power Adapter
CB-E7 Car Battery
Adapter
CR-E7K Charge
Coupler
A1E
Aerial
RU-E3
RF Unit
Antenna
Selector
TV
VTR
C-150 AV Cable
PC-150 SCART Cable
SC-E708 Soft
Carrying Case
Tripod
RS-A1
Rain Shield
HC-A1 System Case
A1F
Selecteur
d'antenne
Televiseur
Unite HF
RU-E3
Transcodeur
TC-E21
Cable AV
C-150
Magnetoscope de salon
Cordon peritelevision PC-180ST

Fig. I-6

2. New Technologies

2-1 Lens section

2-1-1 Optics

Figure I-7 shows the 10x zoom lens arrangement in Model A1. High resolution and superlative contrast are attainable with this optical system.

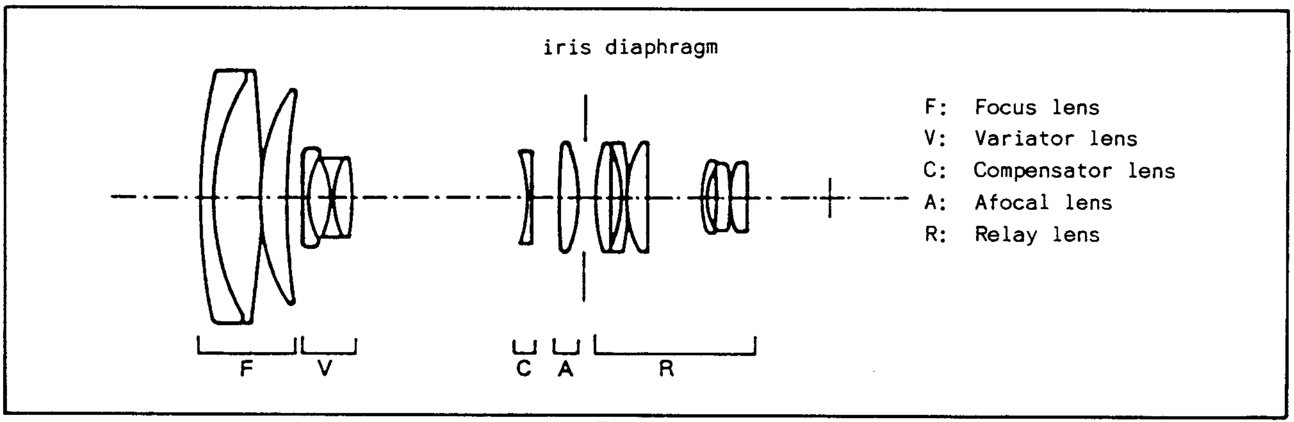

iris diaphragm
F: Focus lens
V: Variator lens
C: Compensator lens
A: Afocal lens
R: Relay lens
F
V
C
A
R

Fig. I-7

The basic design of lens structure in Model A1 is the same as that in Model E80. The Model A1 has aperture ratio (F1.7 at telephoto end) suitable for its 10x zoom lens. Therefore, the filter thread diameter of Model A1 (55 mm) is longer than that of E80, and the new lens accessories are made available for A1.

2-1-2 Piezoelectric auto focus

1) General

Model A1 provides the piezoelectric auto-focusing feature. The CCD solid-state imaging device is oscillated by means of the piezoelectric element (which produces minuscule vibrations when a voltage is applied) to detect sharpness of an image for focusing. This piezoelectric focusing principle is also referred to as 'sharpness detection' or 'contrast detection' focusing approach.

In the piezoelectric focusing, an optical image of subject picked up on the CCD soliid-state imaging device is directly detected and analyzed with the TTL fashion. This feature makes it possible to readily focus a subject through glass, fast-moving subject, or close up distant scene (rather difficult to bring into focus with the conventional infrared sensing approach).

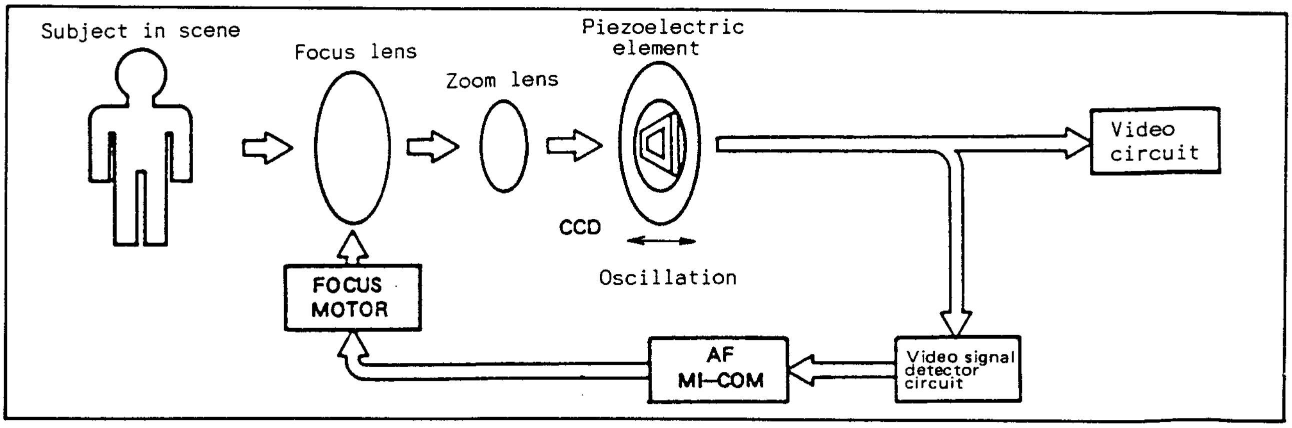

Subject in scene
Focus lens
Zoom lens
Piezoelectric element
CCD
Oscillation
Video circuit
FOCUS MOTOR
AF MI-COM
Video signal detector circuit

Fig. I-8

2) Operating principle

The piezoelectric auto-focus system of Model A1 analyzes the focus state of an image using the high frequency components contained in the video signal to bring a subject into true focus. When the image is out of focus, the video signal contains only low frequency components. But, when it brought closer to focus, the higher frequency components appear in the video signal. Based on this principle, the focus lens is driven to a position where the video signal reaches the highest frequency level.

The piezoelectric element (ceramic oscillating plate) is mounted on the CCD solid-state imaging device, and a sinusoidal voltage is applied to this element. Also, the CCD solid-state imaging device is provided with the minuscule-vibration mechanism so that the direction of focus lens movement can be determined. More specifically, the CCD imaging device is constantly vibrated back and forth at 12.5 Hz, and variations in the high frequency component level of video signal are compared between the forward-shifted position and backward-shifted position of the CCD motion. In the front focus state, the frequency component level increases when the CCD is shifted to the forward position of vibration. Contrarily, in the rear focus state, it increases when the CCD is shifted to the backward position of vibration. According the this change in frequency component level, the focus lens motor is driven to adjust the focus of image.

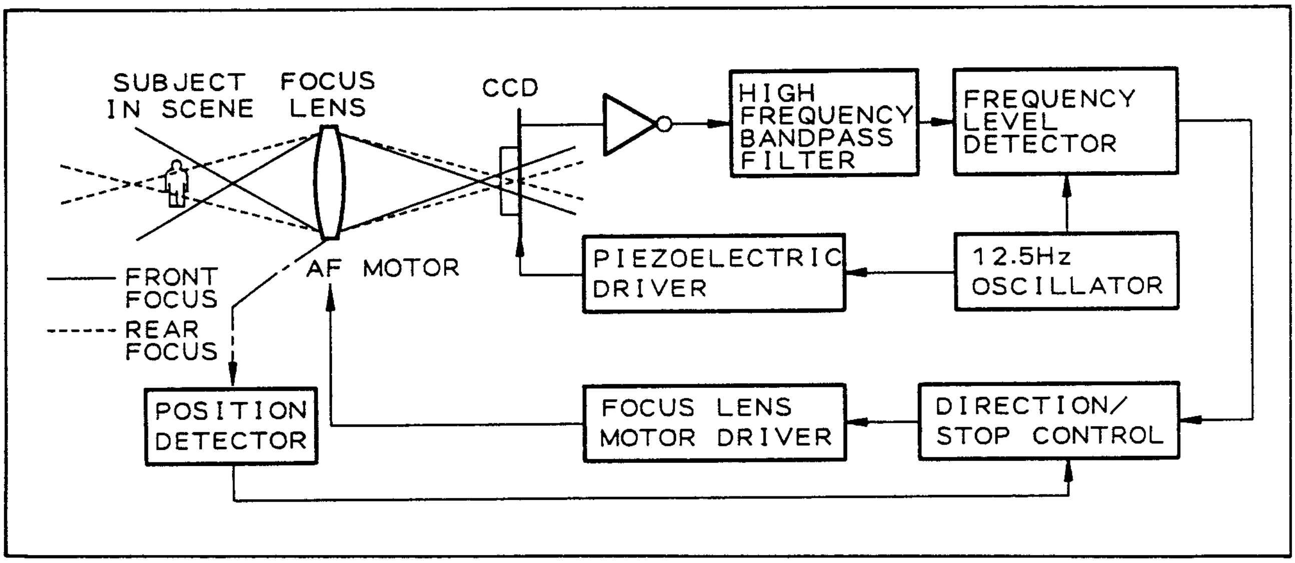

SUBJECT IN SCENE
FOCUS LENS
CCD
HIGH FREQUENCY BANDPASS FILTER
FREQUENCY LEVEL DETECTOR
FRONT FOCUS
REAR FOCUS
AF MOTOR
PIEZOELECTRIC DRIVER
12.5Hz OSCILLATOR
POSITION DETECTOR
FOCUS LENS MOTOR DRIVER
DIRECTION/ STOP CONTROL

Fig. I-9

2-2 Camera section

2-2-1 Advanced Automatic White Balance (A^2 WB)

The Advanced Automatic White Balance (A^2 WB) function is adopted in Model A1. This function is a combination of advantageous features of the conventional TTL (internal) measurement and sensor (external) measurement AWB methods (disadvantages of these conventional methods are eliminated). It is capable of excellent color correction under a variety of light sources. Figure I-10 presents the schematic block diagrams of three AWB functions.

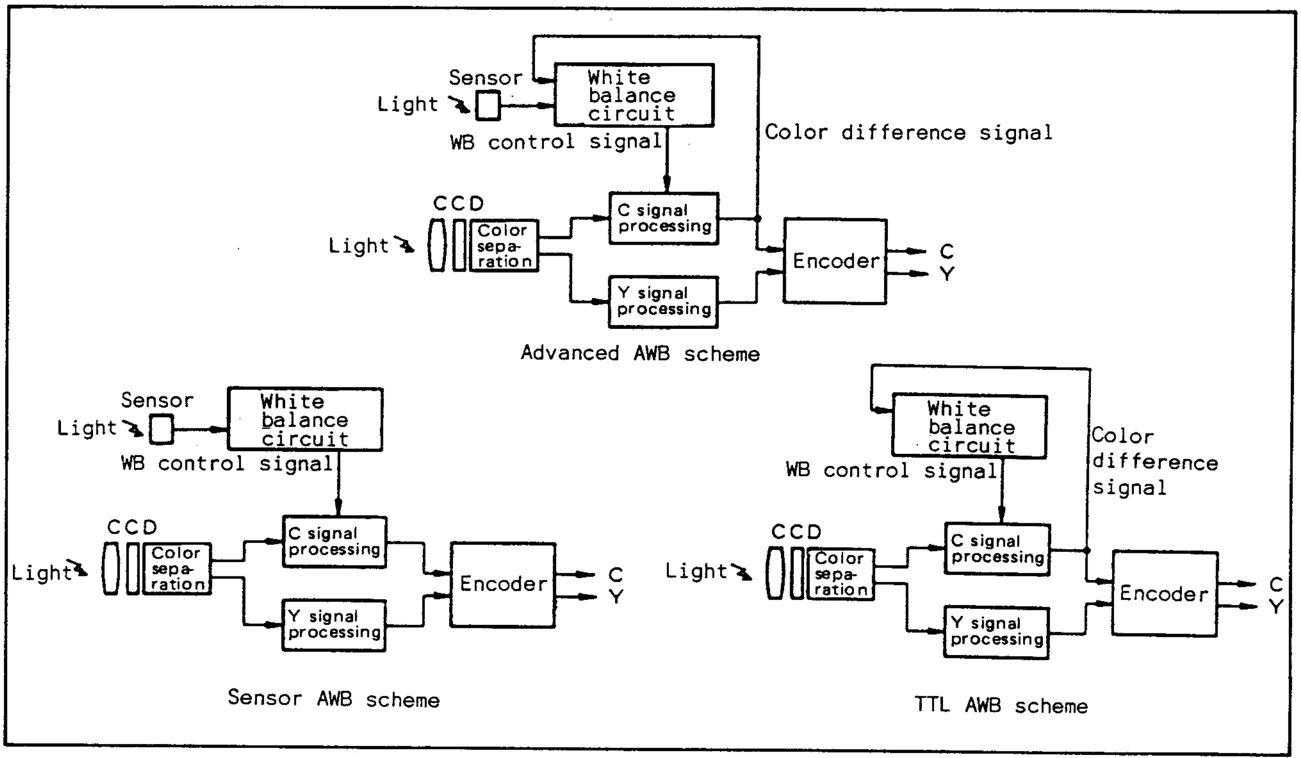

Sensor
Light
White balance circuit
WB control signal
Color difference signal
CCD
Color sepa-ration
C signal processing
Y signal processing
Encoder
C
Y
Advanced AWB scheme
Sensor AWB scheme
Color difference signal
TTL AWB scheme

Fig. I-10

(1) Comparison of white balance methods

Table I-1 compares the four white balance methods as to 'ease of use', 'accuracy' and 'effect by subject color'. As can be seen from this table, although the A^2 WB approach is not superior in accuracy to the manual one-touch method, its overall evaluation is most excellent among the auto white balance methods.

Table I-1 Performance comparison of white balance

Methods	Sensor	TTL	Advanced	One-touch
Ease of use	○	○	○	×
Accuracy (white paper)	△	○	○	◎
*Effect by subject color	○	△	○	○
Total evaluation	○	○	◎	○

◎ Excellent
○ Very good
△ Good
× Not good
* esp. thick color

(2) Ease of white balance adjustment

The A^2 WB function is controlled under direction of the internal microcomputer. The white balance adjustment is carried out according to the program stored in the camera microcomputer (IC2403). And, the adjustment data attained in execution of this internal resident program is written and saved into the E^2 PROM (electrically erasable PROM). Therefore, Model A1 has no variable resistor for white balance adjustment.

2-3 Recorder section

2-3-1 FM stereo audio function

The Model A1 adopts the FM stereo audio function conforming to the optional 8 mm video format. To maintain compatibility with the conventional monaural format (normal type), the L+R sum signal and L-R difference signal are separately frequency-modulated and multiplexed on the video signal. The sum audio signal is frequency-modulated at 1.5 MHz, and the difference audio signal is frequency-modulated at 1.7 MHz.

(1) Audio signal format and frequency spectrum

Table I-2 Audio frequency format

Audio format / Specifications	Normal FM	Stereo FM	
		CH-1	CH-2
FM carrier frequency	1.5 MHz	1.5 MHz	1.7 MHz
Frequency deviation	±100 KHz	±100 KHz	±50 KHz

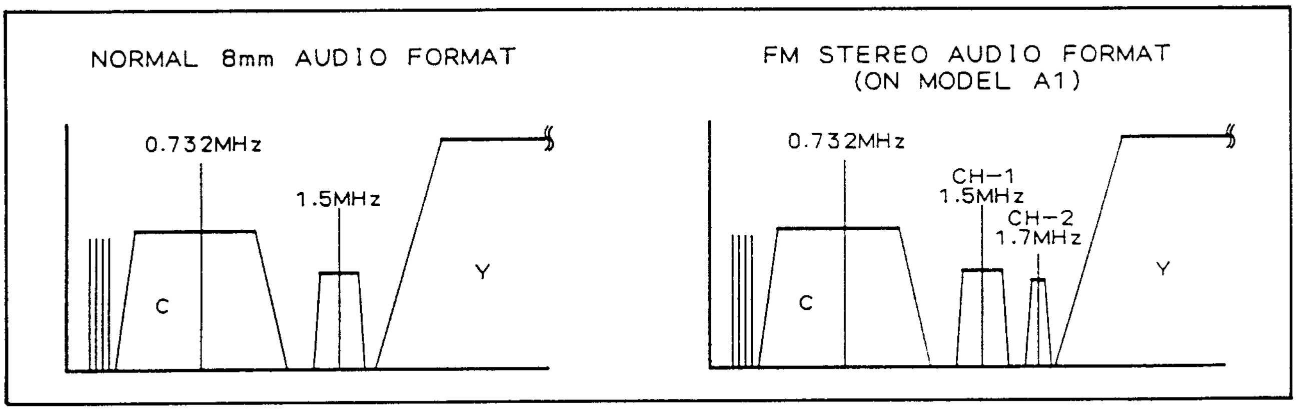


Fig. I-11

(2) Block circuit of FM stereo audio

The audio input signals can be fed to Model A1 through the standard-equipped stereo microphone input line or the external microphone terminal connected with the external stereo input source. The input L and R audio signals are applied to the matrix circuit for separation into L+R sum signal and L-R difference signal. Then, these signals are frequency-modulated with each carrier and multiplexed with the video signals for recording. In playback, the reverse signal processing is carried out to extract the L and R audio signals.

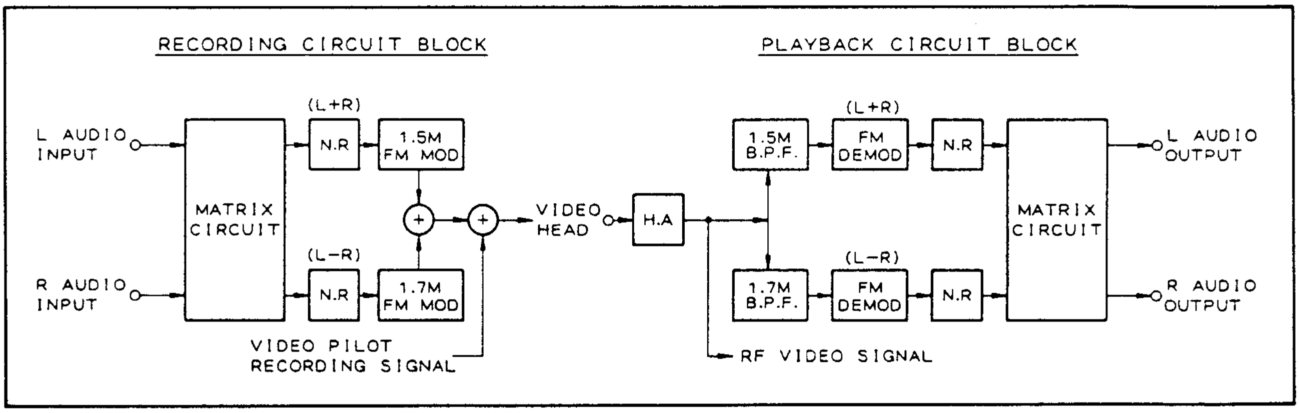

RECORDING CIRCUIT BLOCK
PLAYBACK CIRCUIT BLOCK
L AUDIO INPUT
R AUDIO INPUT
MATRIX CIRCUIT
(L+R)
(L−R)
N.R
1.5M FM MOD
1.7M FM MOD
VIDEO PILOT RECORDING SIGNAL
VIDEO HEAD
H.A
RF VIDEO SIGNAL
1.5M B.P.F.
1.7M B.P.F.
FM DEMOD
N.R
MATRIX CIRCUIT
L AUDIO OUTPUT
R AUDIO OUTPUT

Fig. I-12

3. Circuit Description

3-1 Lens section

3-1-1 Auto focus system

For piezoelectric auto focus system in A1, the video signal is used. The frequency component of video signal from CCD is detected to control the AF microcomputer for a proper focusing at zooming, irising, etc. The measurable range can be adjusted by switching a zone selector button.

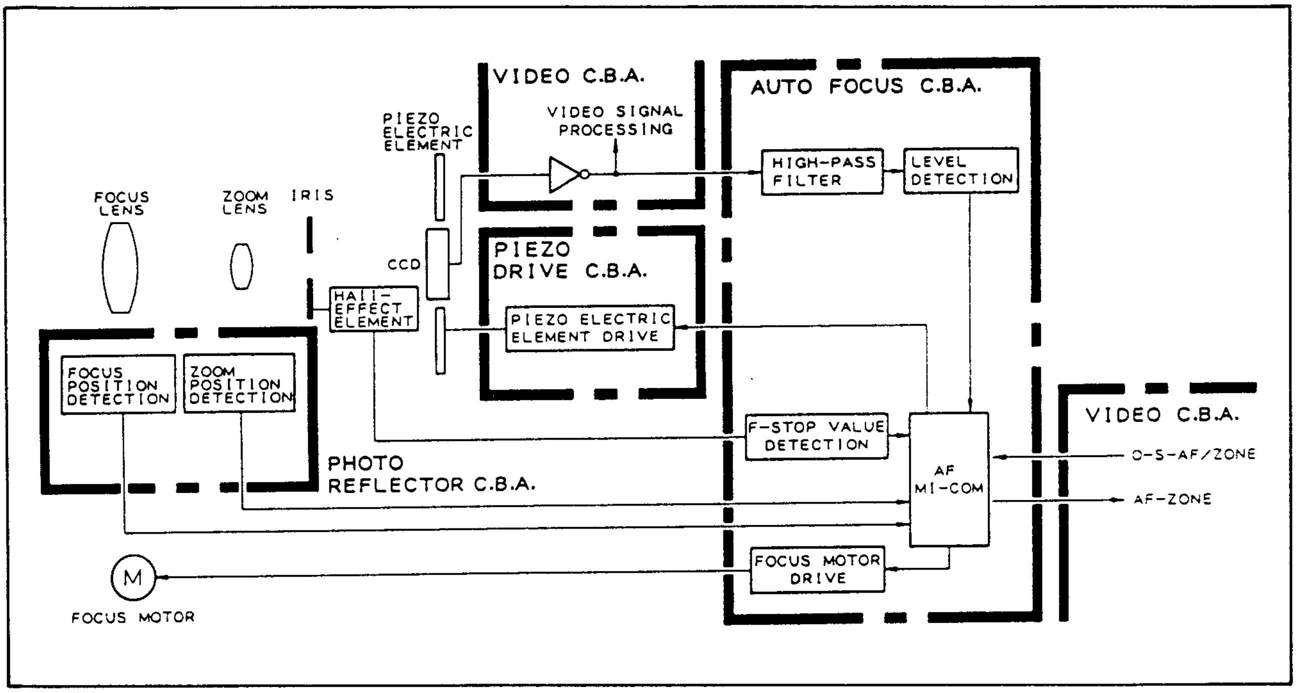

VIDEO C.B.A.
VIDEO SIGNAL PROCESSING
AUTO FOCUS C.B.A.
HIGH-PASS FILTER
LEVEL DETECTION
PIEZO ELECTRIC ELEMENT
FOCUS LENS
ZOOM LENS
IRIS
CCD
PIEZO DRIVE C.B.A.
HALL-EFFECT ELEMENT
PIEZO ELECTRIC ELEMENT DRIVE
FOCUS POSITION DETECTION
ZOOM POSITION DETECTION
F-STOP VALUE DETECTION
VIDEO C.B.A.
O-S-AF/ZONE
AF MI-COM
AF-ZONE
PHOTO REFLECTOR C.B.A.
M
FOCUS MOTOR
FOCUS MOTOR DRIVE

Fig. I-13

To obtain the best focus, the following checks are performed.

1. Rotational direction of focus motor
2. Speed changeover check of focus motor
3. Amplitude of CCD's oscillation
4. In-focus state

3-1-2 AF circuit

(1) Focus motor control

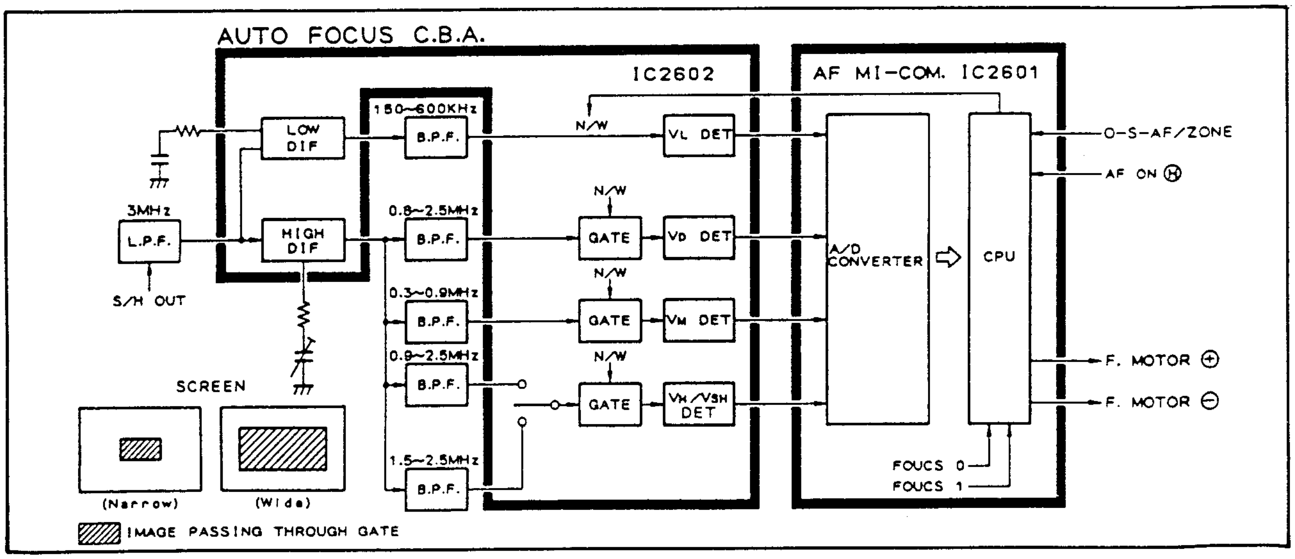

AUTO FOCUS C.B.A.
IC2602
AF MI-COM. IC2601
150~600KHz
LOW DIF
B.P.F.
N/W
VL DET
O-S-AF/ZONE
AF ON Ⓗ
3MHz
L.P.F.
HIGH DIF
0.8~2.5MHz
GATE
VD DET
S/H OUT
0.3~0.9MHz
VM DET
A/D CONVERTER
CPU
0.9~2.5MHz
SCREEN
VH/VSH DET
F. MOTOR ⊕
F. MOTOR ⊖
1.5~2.5MHz
FOUCS 0
FOUCS 1
(Narrow)
(Wide)
IMAGE PASSING THROUGH GATE

Fig. I-14

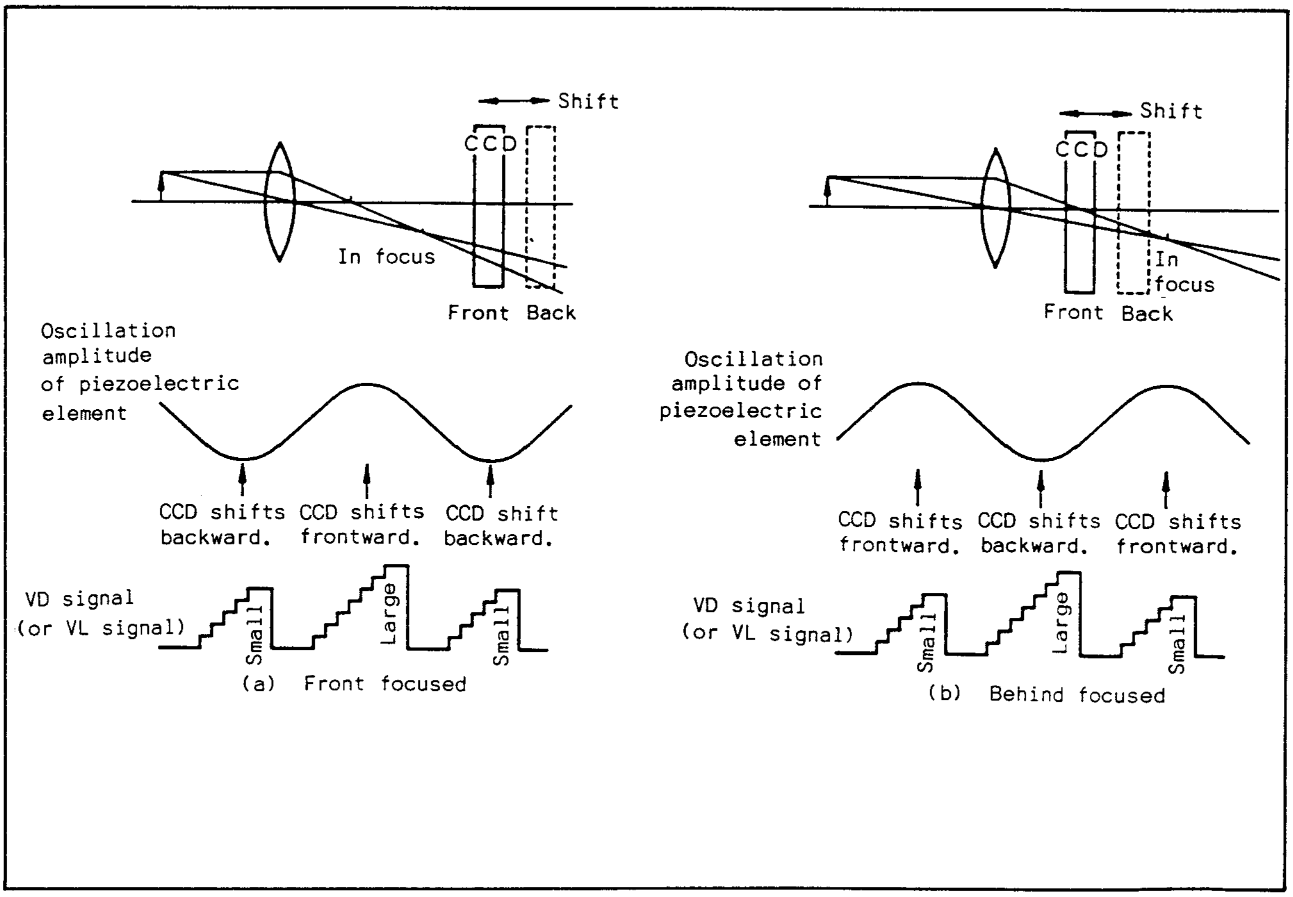
① Signal processing

The S/H OUT signal from the VIDEO circuit board is passed through the LPF for frequency-band restriction and then input to the IC2602. After the signal edge is emphasized by the differential circuit, the following raw signals are extracted through the five BPFs; VL (low band) 150 kHz to 600 kHz, VM (medium band) 300 kHz to 900 kHz, VH (high band) 0.9 MHz to 2.5 MHz, VSH (super high band) 1.5 MHz to 2.5 MHz, and VD (entire band) 0.8 MHz to 2.5 MHz.

The output signals from BPF, except VL, are fed to the gate circuit. Using the N/W (NARROW/WIDE) signal from IC2601, extraction is made only for the AF rangefinding region. Then, after the peak of each output signal is detected by the respective detector circuit, it is sent to the A/D converter and input to the CPU.

② Rotational direction check of focus motor

The VD and VL signals are used to check the rotational direction of focus motor. For this check, the IC2601 compares the oscillation amplitude of piezoelectric element and the level-varying phase of VD/VL signal.


Shift
CCD
In focus
Front Back
Oscillation amplitude of piezoelectric element
CCD shifts backward.
CCD shifts frontward.
CCD shift backward.
VD signal (or VL signal)
Small
Large
Small
Shift
CCD
In focus
Front Back
Oscillation amplitude of piezoelectric element
CCD shifts frontward.
CCD shifts backward.
CCD shifts frontward.
VD signal (or VL signal)
Small
Large
Small
(a) Front focused

(b) Behind focused

Fig. I-15

In the front-focus condition, the oscillation of piezoelectric element is in phase with the level variation of VD signal. Contrarily, in the rear-focus condition, the oscillation of piezoelectric element is 180° out of phase with it. Thus, the rotational direction of focus motor can be checked to output the F MOTOR (+) and F MOTOR (-) signal.

③ Speed changeover check of focus motor

After the rotational direction of focus motor is selected with the VD or VL signal, the speed of focus motor is decelerated according to the current focus condition. With the VL, VM and VH/VSH signals, the IC2601 checks the focus motor speed so that an image can be brought into true focus smoothly.

TAble I-3 Focus motor speed

	Significantly out of focus	Fairly out of focus	Sightly out of focus	Nearly in true focus
VL	×	○	○	○
VM	×	×	○	○
VH/VSH	×	×	×	○
Focus motor speed	High speed	Fairly high speed	Fairly slow speed	Slow speed

○ : High level
× : Low level

④ In-focus check

The VD signal is used to check whether an image is in true focus or not. In the true-focused condition, the VD signal is not liable to vary its amplitude variation even if the CCD is oscillated back and forth by the piezoelectric element. When recognizing that the amplitude variation of VD signal is absent or appreciably small, the IC2601 instructs the focus motor to stop.

(2) Piezoelectric element drive

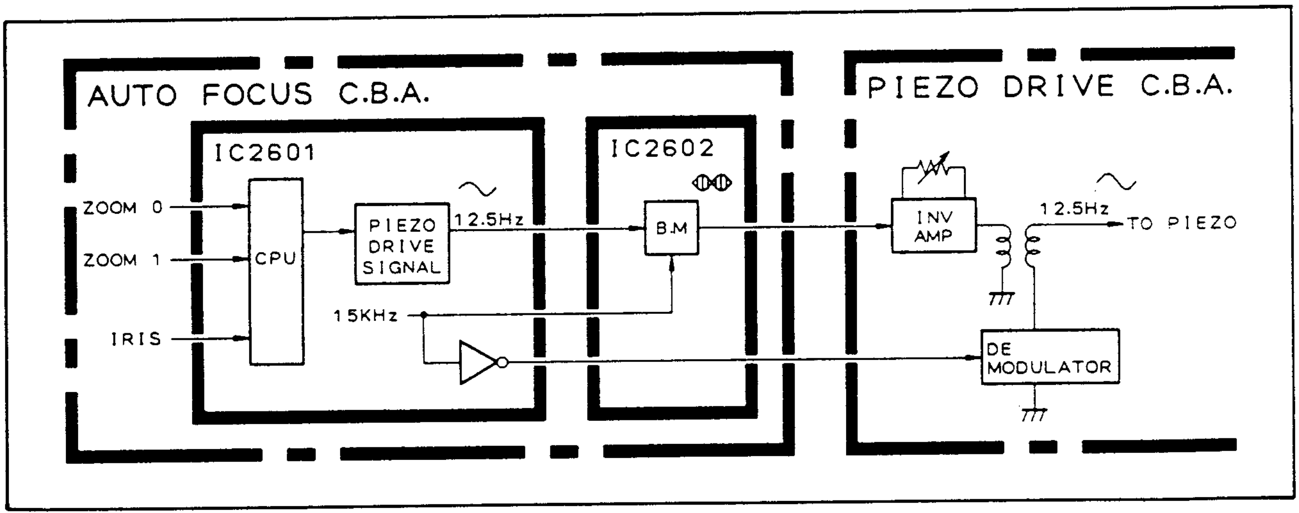


Fig. I-16

The piezoelectric drive signal (12.5 Hz sinusoidal wave) is generated by the IC2601. (At this step of sequence, the amplitude is changed according to the zoom/iris data to determine an oscillation shift range of CCD.) The output signal from IC2601 is balance-modulated with the 15 kHz carrier because of step-up transformation in IC2601. Then, the output signal is inverted and amplified through the PIEZO DRIVE circuit board and its voltage is increased through the transformer. The piezoelectric drive signal, after subjected to step-up transformation, is demodulated and delivered as the 12.5 Hz drive signal.

3-2 Camera section

3-2-1 Power supply circuit

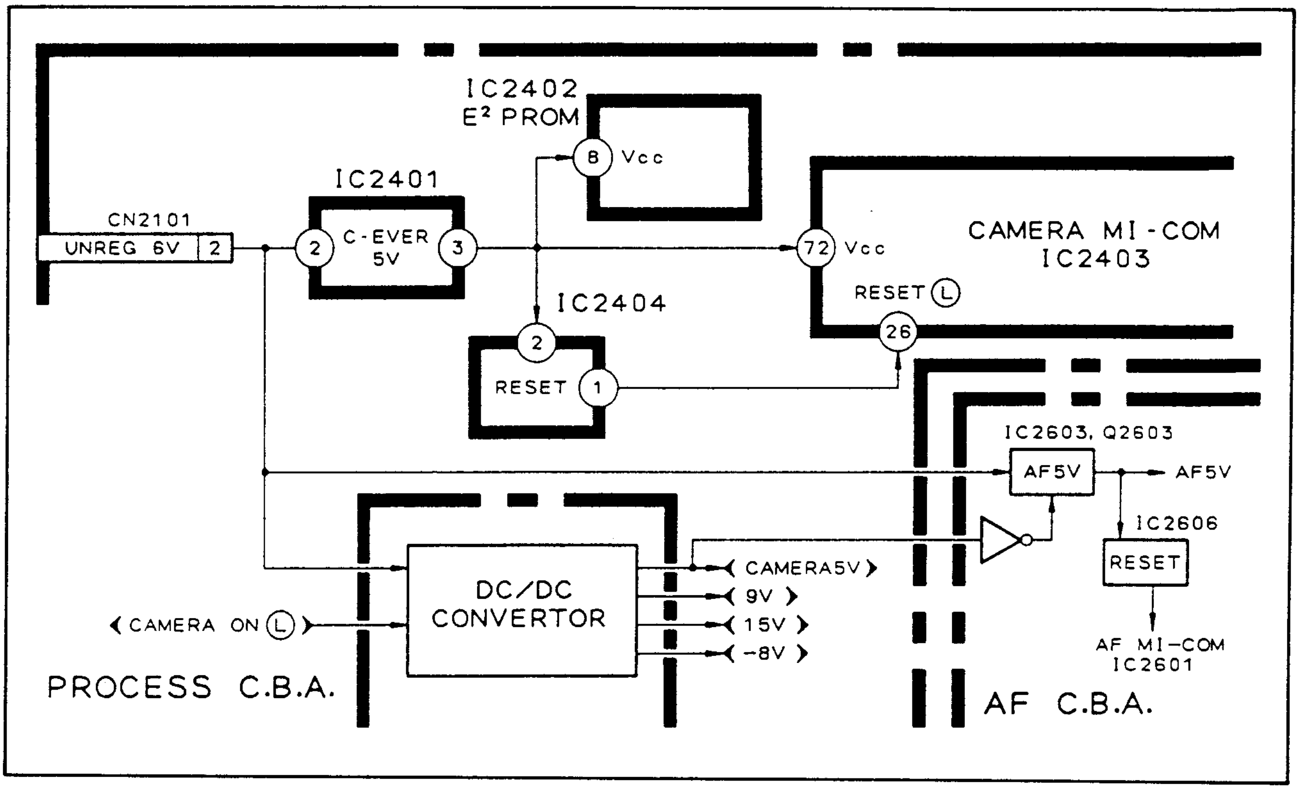

IC2402
E² PROM
8
Vcc
IC2401
C-EVER 5V
2
3
CN2101
UNREG 6V
2
72
Vcc
CAMERA MI-COM
IC2403
RESET (L)
26
IC2404
2
RESET
1
IC2603, Q2603
AF5V
AF5V
IC2606
RESET
AF MI-COM
IC2601
DC/DC CONVERTOR
CAMERA5V
9V
15V
-8V
CAMERA ON (L)
PROCESS C.B.A.
AF C.B.A.

Fig. I-17

(1) Kinds of power sources

The power for camera section is produced using UNREG 6V supplied form the battery or AC adapter.

° C-EVER 5V
When power is connected to the battery terminal, 5V power is delivered through the three-terminal regulator (IC2401) mounted on the PROCESS CBA. This power voltage is constantly output as long as the power supply is connected.

° CAMERA 5V (9V, 15V, -8V)
When the CAMERA ON (L) signal appears at pin 28 of the servo microcomputer IC101, the DC/DC converter turns on to output CAMERA 5V power and 9V, 15V and -8V power for CCD drive.

° AF 5V
Using CAMERA 5V as a trigger voltage, 5V power is output from IC2603 and Q2603 on the AF CBA.

(2) Camera microcomputer resetting sequence

When the main battery is loaded, C-EVER 5V is output and supplied as a power voltage (Vcc) for operation of the camera microcomputer. At this step, the RESET (L) signal that lags behind the leading edge of C-EVER 5V is input from the reset IC (IC2404) to pin 26 of the camera microcomputer. In this fashion, the camera microcomputer is reset during the low-level period of RESET (L) signal.

3-2-2 CCD drive circuit

* The CCD imaging device (1/2-inch size, with 400,000 pixels) in Model A1 is the same as that mounted on VM-E708. The CCD drive circuit configuration in Model A1 is also similar to that used on VM-E708. Note, however, that the CCD drive circuit in Model A1 employs a new type of clock generator (IC2101) specifically designed to meet an electronic shutter speed of 1/2000 sec. When the 1/2000-sec shutter speed is selected, the camera microcomputer inputs the H signal to pin 6 of IC2101.

3-2-3 Processing circuit

* The processing circuit in Model A1 mainly consists of two integrated circuits; IC2203 (AN2153NS) and IC2302 (AN2253FAP). The former is used for luminance/chrominance signal processing, and the latter is used for encoding. The basic signal flow is the same as that in E80. The major difference from E80 is that the ALC/AGC and AWB control operations are conducted under control of the camera microcomputer IC2403.

(1) Iris/AGC control circuit

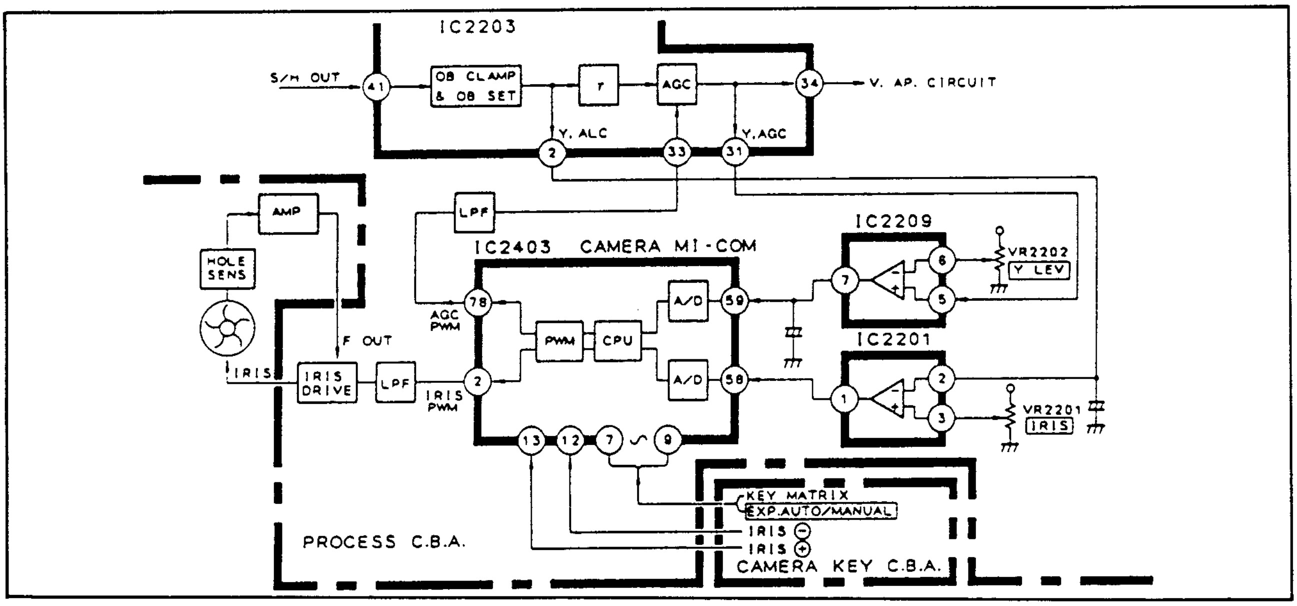

IC2203
S/H OUT
41
OB CLAMP & OB SET
γ
AGC
34
V. AP. CIRCUIT
Y. ALC
Y.AGC
2
33
31
AMP
HOLE SENS
F OUT
IRIS
IRIS DRIVE
LPF
IRIS PWM
LPF
IC2403 CAMERA MI-COM
78
AGC PWM
PWM
CPU
A/D
A/D
59
58
2
13
12
7
9
IC2209
7
6
5
VR2202
Y LEV
IC2201
1
2
3
VR2201
IRIS
KEY MATRIX
EXP.AUTO/MANUAL
IRIS ⊖
IRIS ⊕
PROCESS C.B.A.
CAMERA KEY C.B.A.

Fig. I-18

1) Auto iris operation

The Y ALC signal whose luminance level varies with the quantity of incident light (input to pin 2 of IC2203) is set to the predetermined level by VR2201 under control of IC2201. Then, it is applied to pin 58 of the camera microcomputer IC2403. After subjected to the signal processing in the camera microcomputer, it is output as the PWM signal from pin 2 for driving the iris. In the same manner, the AGC loop is also formed through the camera microcomputer. That is, the Y AGC signal at pin 31 of IC2203 is processed by the microcomputer, and the AGC control operation is performed with the PWM signal output from pin 78.

2) Manual iris operation

When the microcomputer is put in the manual iris mode with the key-matrix input, the AGC PWM signal at pin 78 is adjusted to a duty ratio of 50% to provide constant AGC biasing. Then, according to the IRIS ⊕/⊖ signal input to pins 12 and 13, the duty ratio of IRIS PWM signal at pin 2 is changed to control the iris in an operation range from full-open state to full-closed state.

(2) AWB control circuit

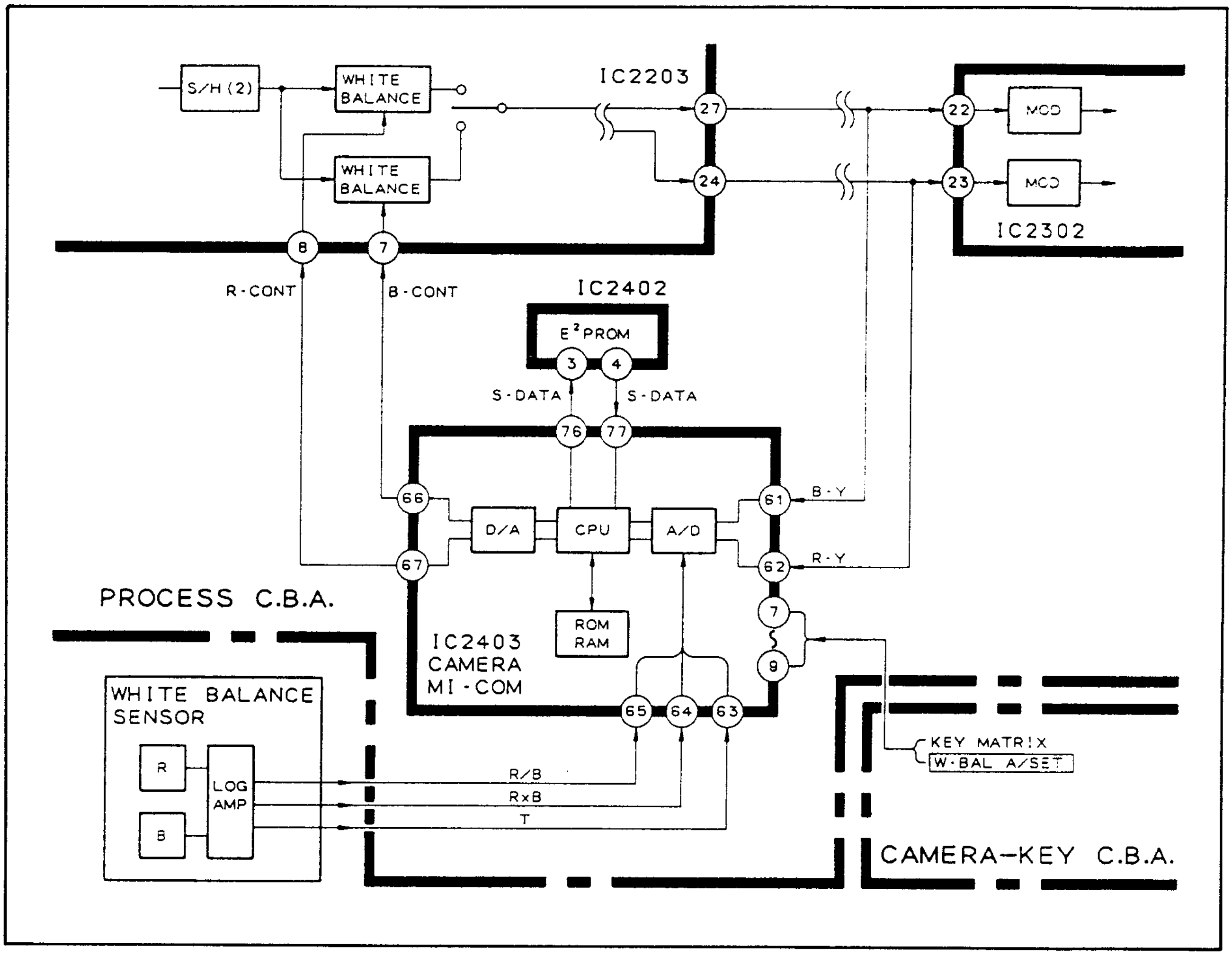

S/H (2)
WHITE BALANCE
WHITE BALANCE
IC2203
27
24
8
7
R·CONT
B·CONT
22
23
MCD
MCD
IC2302
IC2402
E²PROM
3
4
S·DATA
S·DATA
76
77
66
67
D/A
CPU
A/D
61
62
B·Y
R·Y
ROM
RAM
7
9
IC2403
CAMERA
MI·COM
65
64
63
PROCESS C.B.A.
WHITE BALANCE SENSOR
R
B
LOG AMP
R/B
RxB
T
KEY MATRIX
W·BAL A/SET
CAMERA–KEY C.B.A.

Fig. I-19

1) FAWB operation

The white balance sensor inputs the R/B (color temperature data), RxB (luminance data) and T (temperature data) signals to pins 63, 64 and 65 of the camera microcomputer. These data signals are processed by the computational program to determine a color temperature of the subject in scene.

The B-Y and R-Y video signals (color difference signals) are also applied to pins 61 and 62 of the microcomputer. Using these signals, it determines a control voltage level through two-axis correction.

The above data signals (externally measured color temperature data and TTL data) is processed with the internal data stored in the E^2 PROM (IC2402). Eventually, using the B-CONT and R-CONT DC voltage signals appearing from pin 66 and 67, gain amplification is controlled to achieve accurate white balance.

2) AWB setup mode operation

When the microcomputer is put in the AWB setup mode according to the key-matrix input, the microcomputer carries out two-axis correction using only the B-Y and R-Y signals input to pins 61 and 62. Since every hue observable on the vectorscope can be brought to the center in two-axis correction operation, Model A1 is designed to allow AWB setting with reference to white chart.

① V aperture circuit

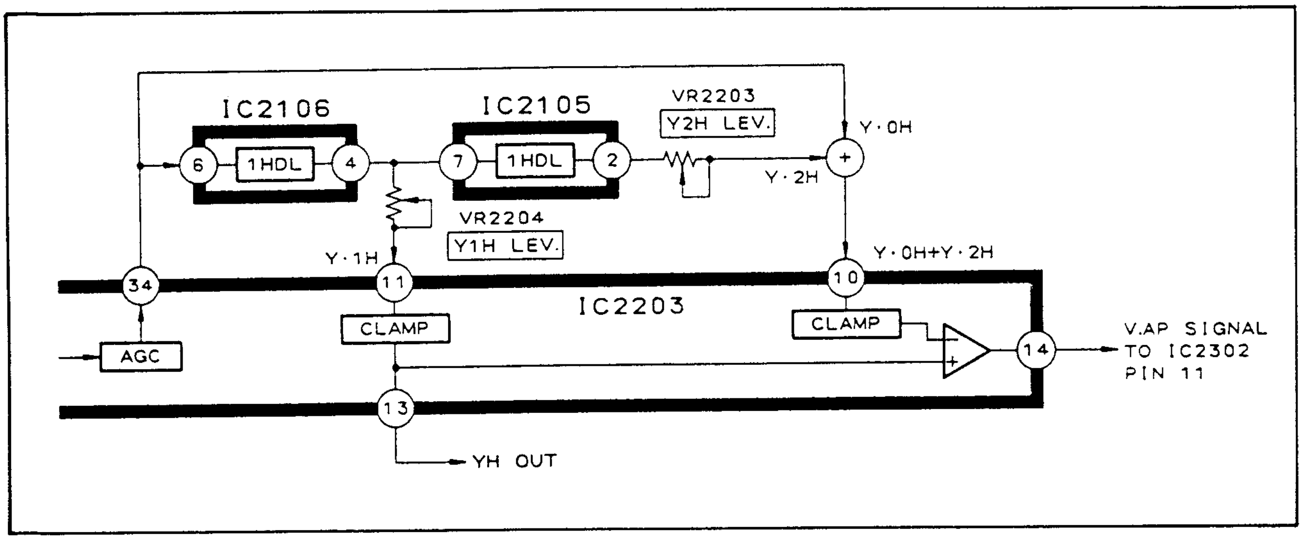

IC2106
IC2105
1HDL
1HDL
6
4
7
2
VR2203
Y2H LEV.
VR2204
Y1H LEV.
Y·0H
Y·2H
Y·1H
Y·0H+Y·2H
34
11
10
14
13
IC2203
CLAMP
CLAMP
AGC
V.AP SIGNAL
TO IC2302
PIN 11
YH OUT

Fig. I-20

The Y AGC output from pin 34 is separated into Y1H signal and Y0H+Y2H signal through the 1H delay lines of IC2105 and IC2106. The difference component extracted from these signals is delivered as V aperture signal from pin 14. The YH signal output from pin 13 is also delivered with 1H delay.

The YH signal and V aperture signal are mixed by the IC2302 encoder circuit to produce the CAMERA Y signal, which is then supplied to the recorder circuit.

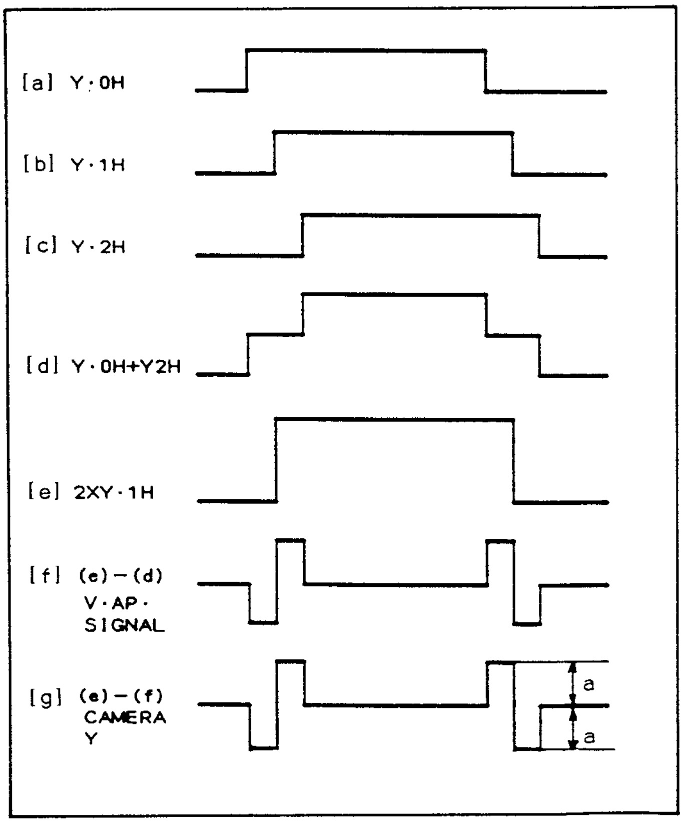

[a] Y·0H
[b] Y·1H
[c] Y·2H
[d] Y·0H+Y2H
[e] 2XY·1H
[f] (e)−(d) V·AP·SIGNAL
[g] (e)−(f) CAMERA Y
a
a

Fig. I-21

3-2-4 Terminal functions of camera microcomputer (IC2403)

Table I-4(1/3) Terminal functions of camera microcomputer (IC2403)

Terminal	Signal designation	I/O	Function
1	-	-	Unused.
2	IRIS PWM	O	Iris control signal.
3	READY Ⓗ	O	Indicate signal that the camera microcomputer is ready for signal data communication with the servo microcomputer (IC101). When this signal is high, serial data can be interchanged with the servo microcomputer. In AWB adjustment, when the power supply is connected, this signal goes low for communication with the E^2 PROM (IC2402).
4	K-IN3	I	Key matrix input. Key-make state at low level.
5	K-IN2	I	
6	K-IN1	I	
7	K-OUT3	O	Key matrix output.
8	K-OUT2	O	
9	K-OUT1	O	
10	-	-	Unused.
11	-	-	
12	IRIS - SW Ⓗ	I	Iris - switch input. Goes high when the switch is pressed.
13	IRIS + SW Ⓗ	I	Iris + switch input. Goes high when the switch is pressed.
14	O-S-AF/ZONE SW Ⓛ	I	One-shot AF/zone switch input. Turn low when the siwtch is pressed.
15	O-S-AF/ZONE	O	In manual focus mode, the AF function is turned on when the one-shot AF control signal goes low. In auto focus mode, the wide/narrow switching is performed each time the AF zone select signal goes low.
16	AF ON Ⓗ	O	Auto focus control signal. goes high when the auto focus mode is selected.
17	C-MODE SW AUTO Ⓗ	I	Camera mode switch input. Goes high when the auto camera mode is selected, and goes low when the manual camera mode is selected.
18	-	-	Connected to CAMERA 5V.
19	CAMERA-CS	I	Used for chip selection in serial data communication with the servo microcomputer (IC101). Serial data communication is carried out while this signal stays high.
20	-	-	Unused.
21	-	-	
22	-	-	
23	-	-	
24	-	-	
25	-	-	Connected to ground.
26	RESET Ⓛ	I	Used as microcomputer reset input when 6V power supply is connected. The camera microcomputer is reset during the low period that lags behind the leading edge of C-EVER 5V.
27	-	-	Unused.
28	X IN	I	Connected with the 10 MHz crystal oscillator.
29	X OUT	O	
30	-	-	Unused.
31	-	-	
32	Vss	-	Connected to the ground.

Table I-4(2/3) Terminal functions of camera microcomputer (IC2403)

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>33</td><td>ADJ. MODE</td><td>O</td><td rowspan="5">*
Used to indicate the AWB adjustment state (in AWB adjustment mode).
Camera unit status output.</td></tr>
<tr><td>34</td><td>ERROR</td><td>O</td></tr>
<tr><td>35</td><td>WRITE</td><td>O</td></tr>
<tr><td>36</td><td>START</td><td>O</td></tr>
<tr><td>37</td><td>END</td><td>O</td></tr>
<tr><td>38</td><td>AE LOCK</td><td>O</td><td>Becomes high in the AE lock state.</td></tr>
<tr><td>39</td><td>STEP2</td><td>O</td><td rowspan="2">Same as above *.</td></tr>
<tr><td>40</td><td>STEP1</td><td>O</td></tr>
<tr><td>41</td><td>-</td><td>-</td><td rowspan="2">Unused.</td></tr>
<tr><td>42</td><td>-</td><td>-</td></tr>
<tr><td>43</td><td>MODE SW</td><td>I</td><td>Indicates the AWB adjustment when this signal goes low.</td></tr>
<tr><td>44</td><td>-</td><td>-</td><td>Unused.</td></tr>
<tr><td>45</td><td>SEL 0</td><td>I</td><td>Used as identification input for television system NTSC, PAL or SECAM.
Turns low for NTSC, and high for PAL/SECAM.</td></tr>
<tr><td>46</td><td>SEL 1</td><td>I</td><td>Connected with CAMERA 5V.</td></tr>
<tr><td>47</td><td>SEL 2</td><td>I</td><td>Connected to the ground.</td></tr>
<tr><td>48</td><td>SEL 3</td><td>I</td><td>AWB adjustment mode (1)/(2) switching input. Becomes low when the mode (1) is selected, and goes high when the mode (2) is selected.</td></tr>
<tr><td>49</td><td>AWB PRESET Ⓗ</td><td>I</td><td>Goes high in camera electric adjustment.
AWB preset mode input.</td></tr>
<tr><td>50</td><td>-</td><td>-</td><td rowspan="3">Unused.</td></tr>
<tr><td>51</td><td>-</td><td>-</td></tr>
<tr><td>52</td><td>-</td><td>-</td></tr>
<tr><td>53</td><td>SHUTTER 2</td><td>O</td><td rowspan="3">Electronic shutter speed control signal
<table>
<tr><th></th><th>1/60</th><th>1/250</th><th>1/500</th><th>1/1000</th><th>1/2000</th></tr>
<tr><td>SHUTTER 2</td><td>L</td><td>L</td><td>H</td><td>H</td><td>-</td></tr>
<tr><td>SHUTTER 1</td><td>L</td><td>H</td><td>L</td><td>H</td><td>-</td></tr>
<tr><td>SHUTTER 0</td><td>L</td><td>L</td><td>L</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td>54</td><td>SHUTTER 1</td><td>O</td></tr>
<tr><td>55</td><td>SHUTTER 0</td><td>O</td></tr>
<tr><td>56</td><td>MANUAL Ⓗ</td><td>O</td><td>ALC circuit control signal. In the manual iris mode, once the recording search button (+/-) is pressed, this signal goes high to hold the output voltage from ALC circuit.</td></tr>
<tr><td>57</td><td>IRIS OPEN Ⓗ</td><td>O</td><td>ALC response control signal. When the opening of iris nearly full, this signal becomes high for quick response in OPEN state.</td></tr>
<tr><td>58</td><td>ALC IN</td><td>I</td><td>Y ALC signal input for ALC control.</td></tr>
<tr><td>59</td><td>AGC IN</td><td>I</td><td>Y AGC signal input for AGC control.</td></tr>
<tr><td>60</td><td>-</td><td>-</td><td>Unused.</td></tr>
<tr><td>61</td><td>B-Y</td><td>I</td><td>B-Y signal input for auto white balance.</td></tr>
<tr><td>62</td><td>R-Y</td><td>I</td><td>R-Y signal input for auto white balance.</td></tr>
<tr><td>63</td><td>T</td><td>I</td><td>Temperature compensation signal input for WB sensor.</td></tr>
<tr><td>64</td><td>R*B</td><td>I</td><td>Luminance signal input for WB sensor.</td></tr>
<tr><td>65</td><td>R/B</td><td>I</td><td>Color temperature signal input for WB sensor.</td></tr>
<tr><td>66</td><td>B-CONT</td><td>O</td><td>B-Y control signal for auto white balance.</td></tr>
<tr><td>67</td><td>R-CONT</td><td>O</td><td>R-Y control signal for auto white balance.</td></tr>
<tr><td>68</td><td>VREF (D/A)</td><td>I</td><td>Reference voltage input in D/A conversion.</td></tr>
<tr><td>69</td><td>VREF (A/D)</td><td>I</td><td>Reference voltage input in A/D conversion.</td></tr>
<tr><td>70</td><td>-</td><td>-</td><td>Connected to ground.</td></tr>
<tr><td>71</td><td>-</td><td>-</td><td>Connected to CAMERA 5V.</td></tr>
<tr><td>72</td><td>Vcc</td><td>-</td><td>Connected to C-EVER 5V.</td></tr>
<tr><td>73</td><td>Vss</td><td>-</td><td>Connected to ground.</td></tr>
</table>

Table I-4(3/3) Terminal functions of camera microcomputer (IC2403)

Terminal	Signal designation	I/O	Function
74	E^2 PROM-CS	0	Used for chip selection in serial data communication with the E^2 PROM (IC2402). Serial data communication is carried out while this signal is high.
75	S-CLOCK	0	Clock output for serial data communication between the servo microcomputer (IC101) and E^2 PROM (IC2402).
76	S-DATA OUT	0	Data output for serial data communication between the servo microcomputer (IC101) and E^2 PROM (IC2402).
77	S-DATA IN	I	Data input for serial data communication between the servo microcomputer (IC101) and E^2 PROM (IC2402).
78	AGC PWM	0	AGC control signal.
79	B-GAIN	0	Matrix correction (B-Y) output.

3-2-5 Communication sequence between camera Microcomputer and E^2 PROM

The E^2 PROM (IC2402) is used to store AWB adjustment values. The camera microcomputer communicates with it only when AWB adjustment is conducted or after the 6V power supply is connected (at the beginning period of readout).

When communication is required, the camera microcomputer IC2403 makes the E^2 PROM-CS signal high at pin 74. While this signal remains high, data communication is carried out. That is, the AWB adjustment data is read out of the E^2 PROM and stored into the camera microcomputer. At step of sequence, the pin-3 output signal is low to disconnect the line to the servo microcomputer.

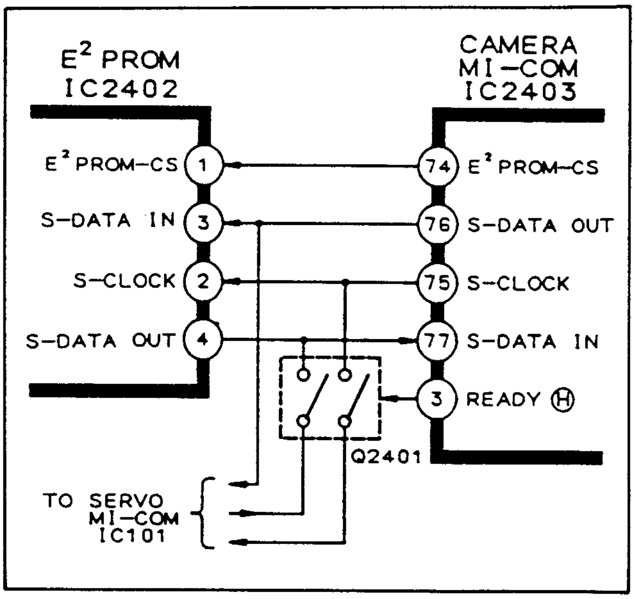

E^2 PROM
IC2402
CAMERA
MI-COM
IC2403
E^2 PROM-CS
1
74
E^2 PROM-CS
S-DATA IN
3
76
S-DATA OUT
S-CLOCK
2
75
S-CLOCK
S-DATA OUT
4
77
S-DATA IN
3
READY Ⓗ
Q2401
TO SERVO
MI-COM
IC101

Fig. I-22

3-3 Recorder section

3-3-1 System control circuit

The system control operation is carried out mainly with the servo microcomputer IC101 and main microcomputer IC001. The system control input signals include; function key signals, mechanical switch signals, fault detection signals, servo data signals, wireless remote control signals. These signals are interpreted, analyzed and processed by the two microcomputers for control of various operations.

Serial data communication among microcomputers, character generator and edit IC is conducted under control of the servo microcomputer IC101.

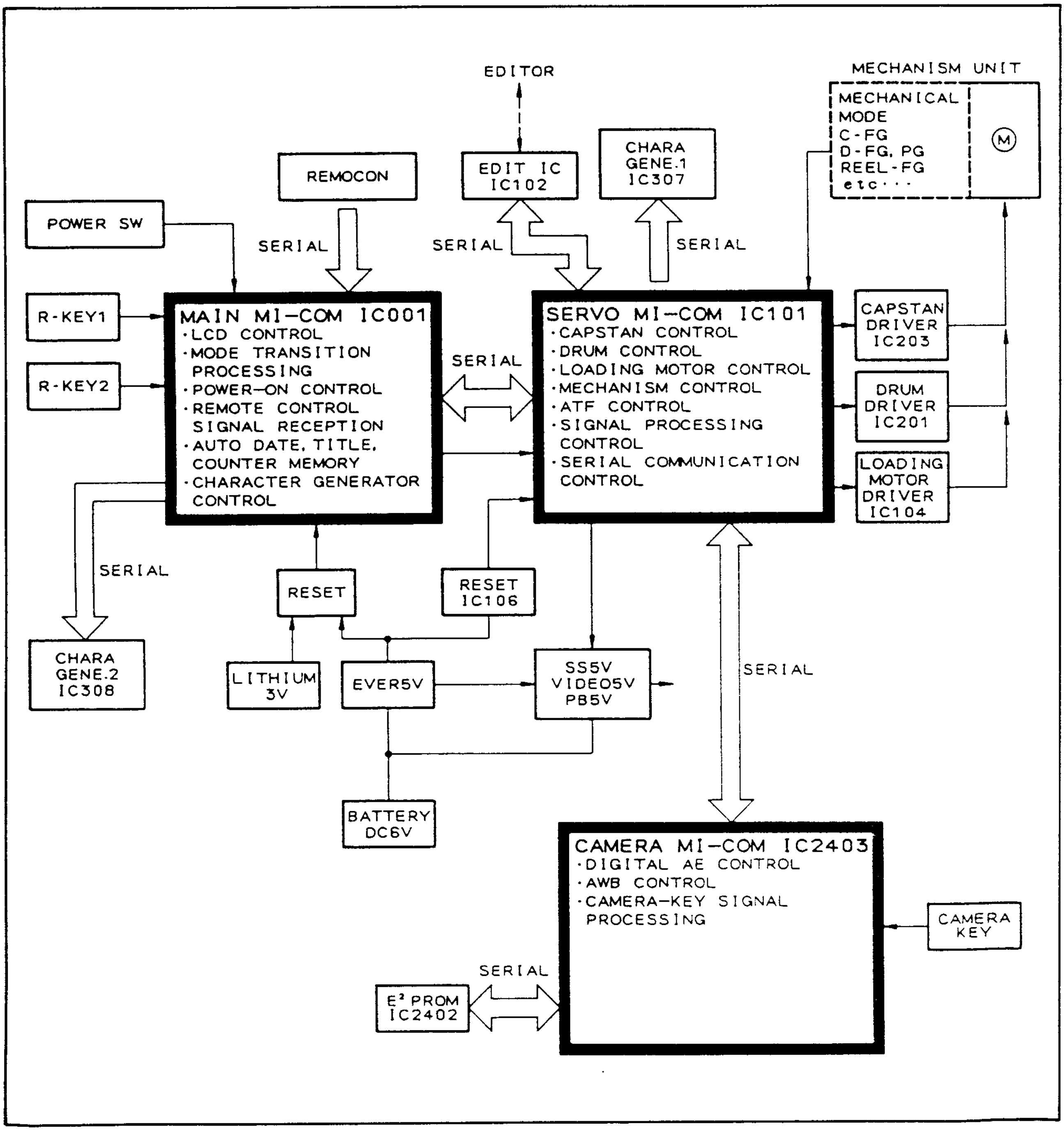

EDITOR
MECHANISM UNIT
MECHANICAL MODE
C-FG
D-FG, PG
REEL-FG
etc···
M
REMOCON
EDIT IC IC102
CHARA GENE.1 IC307
POWER SW
SERIAL
SERIAL
SERIAL
R-KEY1
R-KEY2
MAIN MI-COM IC001
·LCD CONTROL
·MODE TRANSITION PROCESSING
·POWER-ON CONTROL
·REMOTE CONTROL SIGNAL RECEPTION
·AUTO DATE, TITLE, COUNTER MEMORY
·CHARACTER GENERATOR CONTROL
SERIAL
SERVO MI-COM IC101
·CAPSTAN CONTROL
·DRUM CONTROL
·LOADING MOTOR CONTROL
·MECHANISM CONTROL
·ATF CONTROL
·SIGNAL PROCESSING CONTROL
·SERIAL COMMUNICATION CONTROL
CAPSTAN DRIVER IC203
DRUM DRIVER IC201
LOADING MOTOR DRIVER IC104
SERIAL
RESET
RESET IC106
CHARA GENE.2 IC308
LITHIUM 3V
EVER5V
SS5V VIDEO5V PB5V
SERIAL
BATTERY DC6V
CAMERA MI-COM IC2403
·DIGITAL AE CONTROL
·AWB CONTROL
·CAMERA-KEY SIGNAL PROCESSING
CAMERA KEY
SERIAL
E² PROM IC2402

Fig. I-23

(1) Power supply circuit

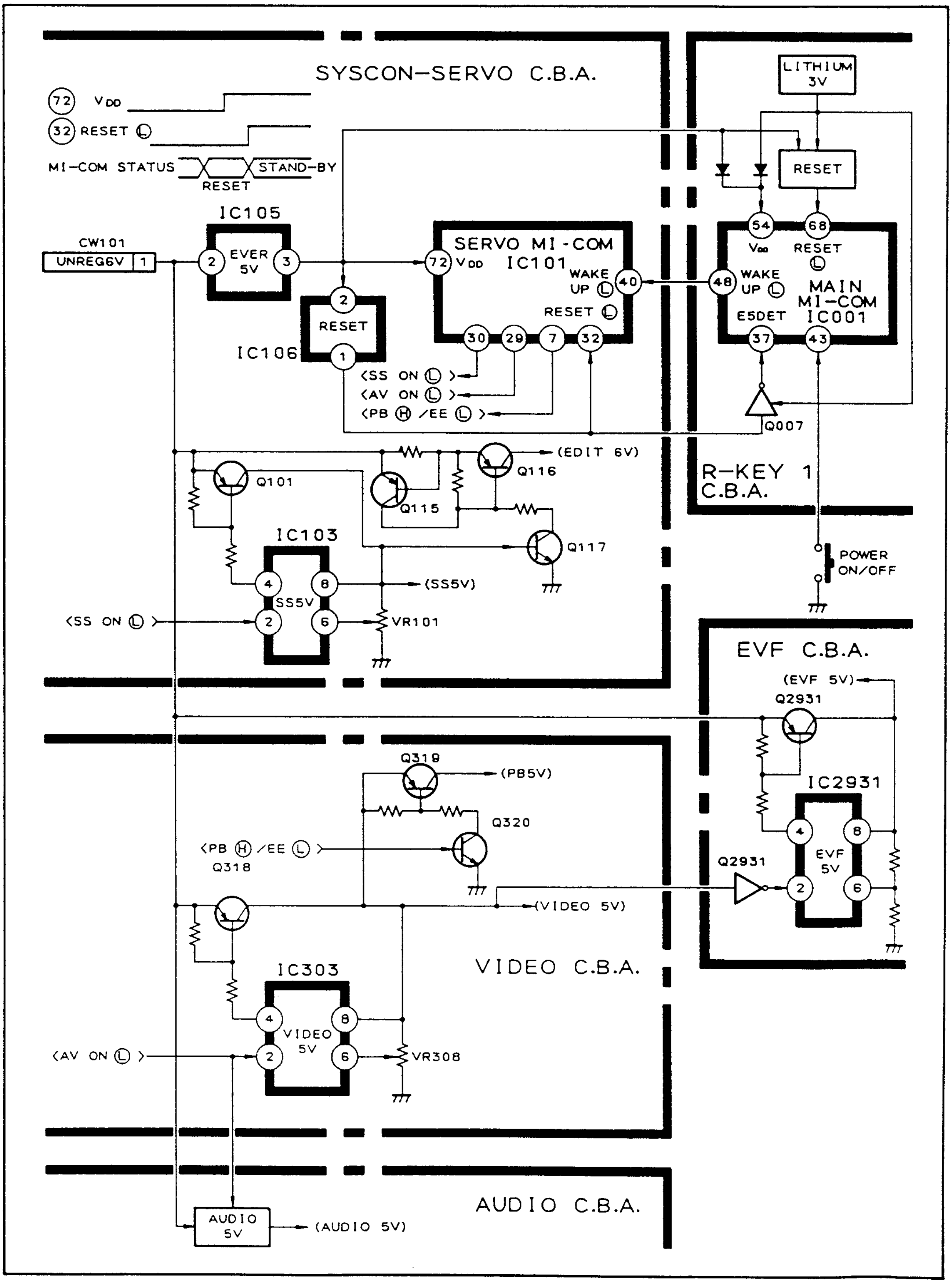

SYSCON–SERVO C.B.A.
72 VDD
32 RESET Ⓛ
MI–COM STATUS
RESET
STAND–BY
IC105
CW101
UNREG6V 1
EVER 5V
2
3
RESET
IC106
1
SERVO MI-COM
72 VDD IC101
WAKE UP Ⓛ 40
RESET Ⓛ
30 29 7 32
〈SS ON Ⓛ〉
〈AV ON Ⓛ〉
〈PB Ⓗ /EE Ⓛ〉
LITHIUM 3V
RESET
54 VDD
68 RESET Ⓛ
48 WAKE UP Ⓛ
MAIN MI–COM IC001
E5DET
37 43
Q007
R–KEY 1 C.B.A.
POWER ON/OFF
(EDIT 6V)
Q101
Q115
Q116
Q117
IC103
4 8
SS5V
2 6
(SS5V)
VR101
〈SS ON Ⓛ〉
EVF C.B.A.
(EVF 5V)
Q2931
IC2931
4 8
EVF 5V
2 6
Q2931
Q319
(PB5V)
Q320
〈PB Ⓗ /EE Ⓛ〉
Q318
(VIDEO 5V)
IC303
VIDEO 5V
4 8
2 6
VR308
〈AV ON Ⓛ〉
VIDEO C.B.A.
AUDIO 5V
(AUDIO 5V)
AUDIO C.B.A.

Fig. I-24

① Kinds of power sources

The power for recorder section is produced using UNIREG 6V supplied from the battery or AC adapter. Also, the 3V power of lithium battery is supplied as a backup power for the main microcomputer used for auto date and timer functions. Listed below are eight power voltage sources provided for the recorder section.

1) EVER 5V
   When the battery terminal is connected with power supply, it is converted to 5V power through the three-terminal regulator (IC105) mounted on SS PCB. The 5V power is constantly delivered as long as the power supply is connected.
2) SS 5V
   When the power switch is turned on, pin 30 of the servo microcomputer (IC101) outputs the SS ON Ⓛ signal. This signal causes the IC103 to turn on. Then, the preset voltage determined with VR101 is compared with the internal reference voltage level to control the output transistor Q101. In this manner, the 5V constant voltage is output.
3) VIDEO 5V
   As in the same fashion for SS 5V, when the AV ON Ⓛ signal appears from pin 29 of the servo microcomputer (IC101), the IC303 turns on the deliver to the 5V constant voltage power.
4) AUDIO 5V
   The AUDIO 5V power is generated through the regulator mounted on the AUDIO C.B.A.. As in the same at VIDEO 5V, the AV ON Ⓛ signal output from pin 29 of the servo microcomputer (IC101) is used for triggering.
5) EVF 5V
   The VIDEO 5V is used for triggering for generation of this power voltage. The 5V constant voltage is output through the IC2931-Q2932 regulator mounted on the EVF C.B.A.
6) EDIT 6V
   This 6V power is supplied from the EDIT terminal of TERMINAL C.B.A. for supplying power to the edit function circuit. Using SS 5V as a trigger, the Q115, 116 and 117 are turned on to produce the EDIT 6V power from UNREG 6V.
7) PB 5V
   In playback, when pin 7 of the servo microcomputer (IC101) outputs the PB Ⓗ signal, the Q319 and 320 are turned on to deliver the VIDEO 5V as PB 5V.
8) LITHIUM 3V
   When power is fed from the lithium battery, the LITHIUM 3V voltage is used as a backup power for the main microcomputer used for auto date and timer functions when the 6V power supply is disconnected. When the 6V power supply connected, the EVER 5V is applied to the main microcomputer.

The servo microcomputer is activated to deliver the power control signal for each mode operation as follows.

When the power supply is connected to the battery terminal, EVER 5V is furnished as each power voltage (VDD) to each microcomputer circuit from IC105. At this step of sequence, the RESET Ⓛ signal which lags behind the leading edge of EVER 5V is input from the reset IC (IC106) to pin 32 of the servo microcomputer IC101. Thus, the servo microcomputer is reset while this signal remains low. Then, upon completion of initialization, the servo microcomputer puts itself in standby state, i.e. ready state.

The main microcomputer IC001, after performing its resetting operation, recognizes 6V power connection with the low level of E5DET signal (pin 37). The main microcomputer then enters its standby mode, i.e. ready state. When only the lithium battery is connected, pin 37 becomes high to indicate that the main micrcomputer is in sleep mode. In the sleep mode, it can control only such auxiliary functions as the auto date recording, title recording, and counter memory functions.

When the power switch is turned on, the low level signal is input to pin 43 of the main microcomputer IC001. If the main microcomputer is in standby mode at this step of sequence, it starts up itself and also outputs the WAKE UP Ⓛ signal to activate the servo microcomputer IC101.

③ Resetting of main microcomputer

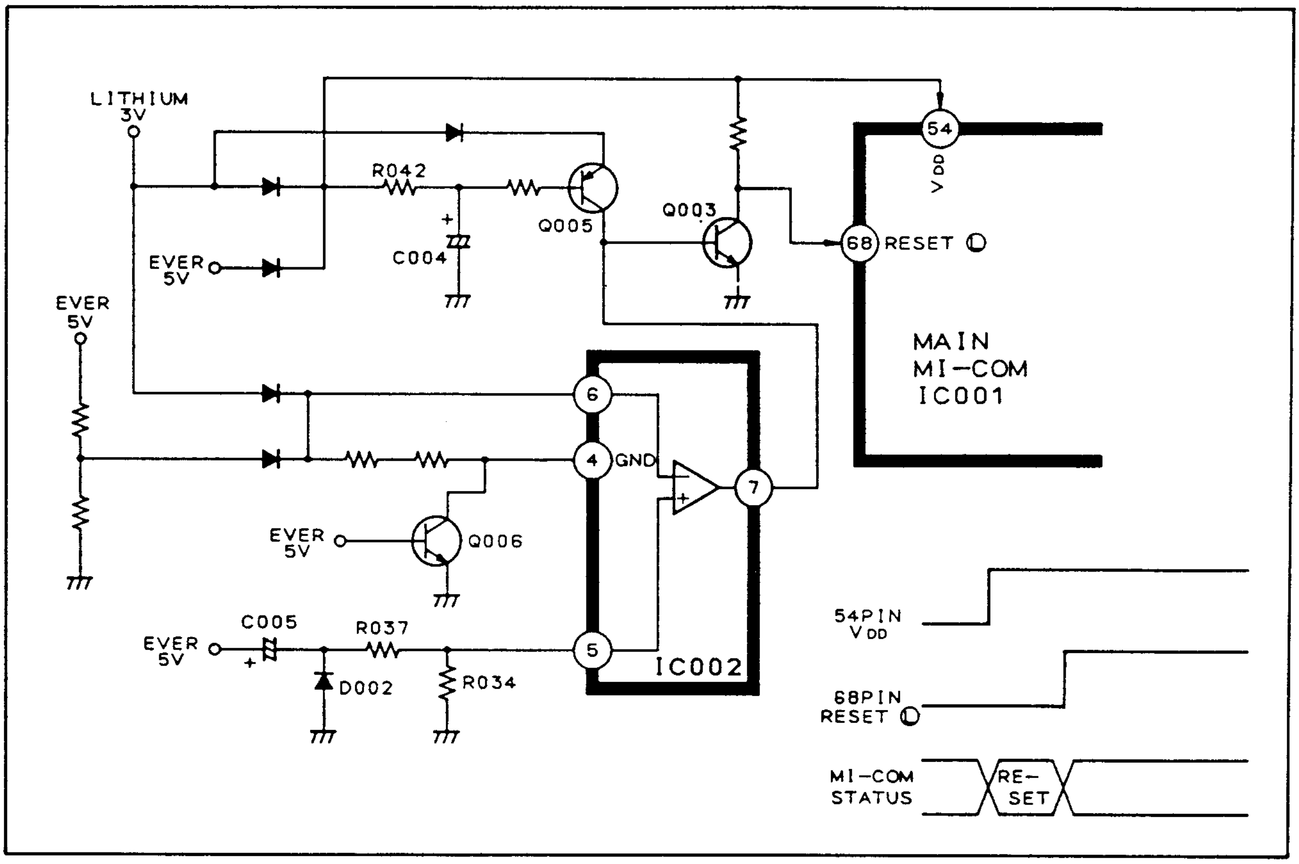

LITHIUM
3V
R042
Q005
+
C004
Q003
54
VDD
68
RESET Ⓛ
EVER
5V
EVER
5V
MAIN
MI-COM
IC001
6
4
GND
7
EVER
5V
Q006
C005
R037
EVER
5V
+
D002
R034
5
IC002
54PIN
VDD
68PIN
RESET Ⓛ
MI-COM
STATUS
RE-
SET

Fig. I-25

The main microcomputer is reset in either of the following two events:

1) The lithium battery is inserted when the main battery is not loaded.
2) The main battery is set when the lithium battery is not loaded.

In either case, the leading edge of RESET Ⓛ signal (pin 68 of IC001) comes behind VDD (pin 54 of IC001) when the power supply is connected. During the low period of this signal, the main microcomputer is reset.

Case 1):
When the lithium battery is loaded, 3V power is applied to the emitter of Q005. And, during the period determined by the time constant of R042 and C004, the voltage level at the base of Q005 rises to turn on Q003. The Q003 remains on until Q005 goes off. While the Q003 stays on, pin 68 goes low to reset the main microcomputer.

Case 2):
When the main battery is loaded, the EVER 5V power is output. And, during the period determined by the time constant of C005, R037 and R034, the pulse signal is generated and input to pin 5 of IC002. At this step of sequence, the comparator in IC feeds the high-level pulse from its pin 7 to trigger on Q003. While the Q003 is on, pin 68 stays low to reset the main microcomputer. When the lithium battery is loaded, the high-level pulse is not output from pin 7 since 3V power is applied to pin 6 of IC002.

Table I-5(1/3) Terminal functions of servo microcomputer (IC101)

Pin No.	Signal designation	I/O	Function
28	CAMERA ON Ⓛ	O	Camera power control signal. Goes low when the camera power supply is turned on.
29	AV ON Ⓛ	O	Signal-circuit power (VIDEO 5V, AUDIO 5V) control signal. Goes low when the singal-circuit power supply is turned on.
30	SS ON Ⓛ	O	System control servo power (SS 5V) control signal. Goes low when the system control servo power supply is turned on.
31	-	-	Connected to ground.
32	RESET Ⓛ	I	Microcomputer reset input. The microcomputer is reset during the low-level period that lags behind the leading edge of EVER 5V.
33	Vss	-	Connected to ground.
34	X OUT	O	Connected with the 8 MHz crystal oscillator.
35	X IN	I	
36	-	-	Connected to EVER 5V.
37	-	-	Connected to EVER 5V.
38	CG1-DATA OUT	O	Data output for serial data communication with the character generator 1 (IC307).
39	CG1-CLOCK	O	Clock output for serial data communication with the character generator 1 (IC307).
40	WAKE UP Ⓛ	I	Servo microcomputer start signal. The servo microcomputer is start up when the low-level pulse is applied.
41	S-DATA IN	I	Data input for serial data communication with the main microcomputer (IC001), camera microcomputer (IC2403) and edit IC (IC102).
42	S-DATA OUT	O	Data output for serial data communication with the main microcomputer (IC001), camera microcomputer (IC2403) and edit IC (IC102).
43	S-CLOCK	I	Clock input for serial data communication with the main microcomputer (IC001), camera microcomputer (IC2403) and edit IC (IC102).
44	DEW Ⓗ	I	DEW sensor input temrinal.
45	BATT.	I	Low battery voltage detection terminal.
46	T-REEL FG	I	FG input terminal for the takeup reel.
47	S-REEL FG	I	FG input terminal for the supply reel.
48	SLOW ADJ.	I	Unused.
49	STILL ADJ.	I	
50	SW POINT ADJ.	I	Switching pointer adjust terminal.
51	ATF ERROR	I	ATF error input terminal.
52	AVss	-	Connected to ground.
53	AV REF	I	Connected to EVER 5V.
54	AV DD		Connected to EVER 5V.
55	BOT Ⓛ	I	When the beginning of tape is detected, this signal goes low in synchronization with turn-on of LED.
56	EOT Ⓛ	I	When the end of tape is detected, this signal goes low in synchronization with turn-on of LED.
57	ATF LOCK Ⓛ	I	In playback, this signal goes low when the normal phase locking is made in the ATF phase servo control circuit.
58	C-SYNC	I	Composite sync input terminal for the rotation servo control circuit.
59	-	-	Connected to EVER 5V.

(2) Terminal functions of servo microcomptuer (IC101)

Table I-5(2/3) Terminal functions of servo microcomputer (IC101)

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>SEL1</td><td>O</td><td>Used for controlling the ATF PILOT signal frequencies.
<table>
<tr><td>PILOT</td><td>f1</td><td>f2</td><td>f3</td><td>f4</td></tr>
<tr><td>SEL1</td><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>SEL2</td><td>H</td><td>H</td><td>L</td><td>L</td></tr>
</table></td></tr>
<tr><td>2</td><td>HEAD SW PULSE</td><td>O</td><td>Head switching pulse output.</td></tr>
<tr><td>3</td><td>-</td><td>-</td><td>Unused.</td></tr>
<tr><td>4</td><td>JOG Ⓗ</td><td>O</td><td>Normal/special playback select signal for the video circuit. In the special playback, this signal goes high.</td></tr>
<tr><td>5</td><td>A-MUTE Ⓗ</td><td>O</td><td>Audio mute signal. Goes high for muting.</td></tr>
<tr><td>6</td><td>V-MUTE Ⓗ</td><td>O</td><td>Video mute signal. Goes high for muting.</td></tr>
<tr><td>7</td><td>PB Ⓗ/EE Ⓛ</td><td>O</td><td>PB/EE select signal for the video and audio circuits. Goes high for PB.</td></tr>
<tr><td>8</td><td>SP Ⓗ/LP Ⓛ</td><td>O</td><td>Unused.</td></tr>
<tr><td>9</td><td>Hi8 Ⓗ/NORM Ⓛ</td><td>O</td><td>High-band/normal-band select signal for the video circuit. Turns high when the high-band is selected.</td></tr>
<tr><td>10</td><td>CAMERA Ⓗ/LINE Ⓛ</td><td>O</td><td>Camera/line select signal for the video and audio circuits. Goes high when the camera input is selected.</td></tr>
<tr><td>11</td><td>DISPLAY Ⓛ</td><td>O</td><td>Becomes low when the character generator 1 (IC307) output is displayed on the monitor.</td></tr>
<tr><td>12</td><td>CAPSTAN TORQUE Ⓗ</td><td>O</td><td>Goes high when the drive torque of capstan motor is increased.</td></tr>
<tr><td>13</td><td>CAPSTAN FWD Ⓗ</td><td>O</td><td>Capstan motor forward/reverse drive select signal. Turns high when the capstan motor is driven in forward direction (FWD).</td></tr>
<tr><td>14</td><td>CAPSTAN ON Ⓗ</td><td>O</td><td>Capstan IC control signal. Goes high when the capstan drive IC is powered on.</td></tr>
<tr><td>15</td><td>DRUM BRAKE Ⓗ</td><td>O</td><td>Goes high when the drum motor is braked.</td></tr>
<tr><td>16</td><td>-</td><td>-</td><td>Unused</td></tr>
<tr><td>17</td><td>AB PULSE</td><td>O</td><td>CH-1/CH-2 overlap recording control signal. During approx. 30H period of head switching, this signal goes high for recording channels 1 and 2.</td></tr>
<tr><td>18</td><td>JOG VD</td><td>O</td><td>Pseudo VD output inserted into the video signal in accelerated/decelerated playback.</td></tr>
<tr><td>19</td><td>CAMERA-CS</td><td>O</td><td>Used for chip selection in serial data communication with the camera microcomputer (IC2403). While this signal is high, serial communication is carried with the camera microcomputer.</td></tr>
<tr><td>20</td><td>EDIT-CS</td><td>O</td><td>Used for chip selection in serial data communication with the edit IC (IC102). Serial data communication is carried out while this signal remains high.</td></tr>
<tr><td>21</td><td>MAIN-CS</td><td>O</td><td>Used for chip selection in serial data communication with the main microcomputer (IC001). Serail data communication is carried out while this signal is high.</td></tr>
<tr><td>22</td><td>CG1-STROBE</td><td>O</td><td>Data read instruction signal to the character generator 1 (IC307). The high-level signal is output on completion of data transfer.</td></tr>
<tr><td>23</td><td>DRUM FWD Ⓗ</td><td>O</td><td>Drum motor forward/reverse drive select signal. Goes high when the drum motor is driven in the forward direction (FWD).</td></tr>
<tr><td>24</td><td>MODE SW3</td><td rowspan="3">I</td><td rowspan="3">Mechanical mode siwtch input.
(Consists of three bits; Used for detecting mechanism mode position)</td></tr>
<tr><td>25</td><td>MODE SW2</td></tr>
<tr><td>26</td><td>MODE SW1</td></tr>
<tr><td>27</td><td>TAPE SENS. LED</td><td>O</td><td>BOT/EOT sensing LED turn-on signal.</td></tr>
</table>

Table I-5(3/3) Termfinal functions of servo microcomputer (IC101)

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>60</td><td>D-PG</td><td>I</td><td>Drum PG input terminal.</td></tr>
<tr><td>61</td><td>D-FG</td><td>I</td><td>Drum FG input terminal.</td></tr>
<tr><td>62</td><td>C-FG</td><td>I</td><td>Capstan FG input terminal.</td></tr>
<tr><td>63</td><td>-</td><td>-</td><td>Unused.</td></tr>
<tr><td>64</td><td>-</td><td>-</td><td>Unused.</td></tr>
<tr><td>65</td><td>UNLOAD Ⓗ</td><td>O</td><td rowspan="2">Loading motor control signal
<table>
<tr><th>Signal/Operation</th><th>LOAD</th><th>UNLOAD</th><th>BRAKE</th></tr>
<tr><td>LOAD Ⓗ</td><td>H</td><td>L</td><td>H</td></tr>
<tr><td>UNLOAD Ⓗ</td><td>L</td><td>H</td><td>H</td></tr>
</table></td></tr>
<tr><td>66</td><td>LOAD Ⓗ</td><td>O</td></tr>
<tr><td>67</td><td>D-PWM</td><td>O</td><td>Drum motor drive signal.</td></tr>
<tr><td>68</td><td>C-PWM</td><td>O</td><td>Capstan motor drive signal.</td></tr>
<tr><td>69</td><td>Hi8 DET Ⓗ</td><td>I</td><td>Used for identifying the video tape to be played back.
Goes high when the high-band tape is used.</td></tr>
<tr><td>70</td><td>CC DOWN Ⓛ</td><td>I</td><td>Cassette compartment move-down switch input. This signal goes low when the cassette compartment moves down, and goes high when it moves up.</td></tr>
<tr><td>71</td><td>-</td><td>-</td><td>Connected to EVER 5V.</td></tr>
<tr><td>72</td><td>VDD</td><td>-</td><td>Connected to EVER 5V.</td></tr>
<tr><td>73</td><td>Vss</td><td>-</td><td>Connected to ground.</td></tr>
<tr><td>74</td><td>-</td><td>-</td><td>Connected to EVER 5V.</td></tr>
<tr><td>75</td><td>REC Ⓗ</td><td>O</td><td>REC AMP control signal. Becomes high for recording.</td></tr>
<tr><td>76</td><td>FE ON Ⓗ</td><td>O</td><td>FE head turn-on control signal. Becomes high for erasing.</td></tr>
<tr><td>77</td><td>CH-1' H-SW-PULSE</td><td>O</td><td>CH-1/CH-1' switching pulse in the slow-motion, still, or frame advance playback operation.</td></tr>
<tr><td>78</td><td>TS B</td><td>O</td><td>ATF LOCK sample/hold signal. This signal goes low for sampling, and goes high for holding.</td></tr>
<tr><td>79</td><td>ATF SW</td><td>O</td><td>ATF BPF select signal.
Turns low upon detection of an ATF error on f1 or f3 track.
Turns high upon detection of an ATF error on f2 or f4 track.</td></tr>
<tr><td>80</td><td>SEL2</td><td>O</td><td>See SEL1 ① PIN.</td></tr>
</table>

(3) Terminal functions of main microcomputer (IC001)

Table I-6(1/3) Terminal functions of main microcomputer (IC001)

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>S12</td><td>O</td><td rowspan="4">LCD segment drive terminals.</td></tr>
<tr><td>2</td><td>S13</td><td>O</td></tr>
<tr><td>3</td><td>S14</td><td>O</td></tr>
<tr><td>4</td><td>S15</td><td>O</td></tr>
<tr><td>5</td><td>-</td><td>-</td><td rowspan="8">Unused.</td></tr>
<tr><td>6</td><td>-</td><td>-</td></tr>
<tr><td>7</td><td>-</td><td>-</td></tr>
<tr><td>8</td><td>-</td><td>-</td></tr>
<tr><td>9</td><td>-</td><td>-</td></tr>
<tr><td>10</td><td>-</td><td>-</td></tr>
<tr><td>11</td><td>-</td><td>-</td></tr>
<tr><td>12</td><td>-</td><td>-</td></tr>
<tr><td>13</td><td>K-OUT0</td><td>O</td><td rowspan="4">Key matrix output. Low-level pulse.</td></tr>
<tr><td>14</td><td>K-OUT1</td><td>O</td></tr>
<tr><td>15</td><td>K-OUT2</td><td>O</td></tr>
<tr><td>16</td><td>K-OUT3</td><td>O</td></tr>
<tr><td>17</td><td>CG2-CS</td><td>O</td><td>Used for chip selection in serial data communication with the character generator 2 (IC308). Serial data communication is carried while this signal stays high.</td></tr>
<tr><td>18</td><td>CG2-STROBE</td><td>O</td><td>Data read instruction signal to the character generator 2 (IC308). This signal goes high on completion of data transfer.</td></tr>
<tr><td>19</td><td>TELE Ⓛ</td><td>O</td><td rowspan="2">Zoom motor control signal. Output terminal for remote control input.</td></tr>
<tr><td>20</td><td>WIDE Ⓛ</td><td>O</td></tr>
<tr><td>21</td><td>COM0</td><td>O</td><td rowspan="4">Used for LCD common terminal drive.</td></tr>
<tr><td>22</td><td>COM1</td><td>O</td></tr>
<tr><td>23</td><td>COM2</td><td>O</td></tr>
<tr><td>24</td><td>COM3</td><td>O</td></tr>
<tr><td>25</td><td>-</td><td>-</td><td rowspan="4">Unused.</td></tr>
<tr><td>26</td><td>-</td><td>-</td></tr>
<tr><td>27</td><td>-</td><td>-</td></tr>
<tr><td>28</td><td>-</td><td>-</td></tr>
<tr><td>29</td><td>ME Ⓗ/MP Ⓛ</td><td>I</td><td>ME tape identification input. The ID holes on cassette are used for identification of the type of cassette.
The high input is applied when the ME tape is used, and the low input is applied when the MP tape is used.</td></tr>
<tr><td>30</td><td>SAFETY TAB Ⓗ</td><td>I</td><td>Erroneous erasure preventing input.
The high input is applied when the erroneous erasure preventing switch on cassette is set to the record-inhibit position.</td></tr>
<tr><td>31</td><td>SEL A</td><td>I</td><td rowspan="2">Input terminal for identifying the television system.
<table>
<tr><th></th><th>JPN</th><th>USA</th><th>PAL</th><th>SECAM</th></tr>
<tr><td>SEL A</td><td>H</td><td>H</td><td>L</td><td>L</td></tr>
<tr><td>SEL B</td><td>L</td><td>H</td><td>H</td><td>L</td></tr>
</table></td></tr>
<tr><td>32</td><td>SEL B</td><td>I</td></tr>
<tr><td>33</td><td>Vss</td><td>-</td><td>Connected to ground.</td></tr>
<tr><td>34</td><td>LITHIUM EMPTY Ⓛ</td><td>I</td><td>The low input is applied when the terminal voltage of lithium battery decreases below approx. 2.7 V.</td></tr>
<tr><td>35</td><td>HiMP Ⓗ</td><td>I</td><td>HiMP tape identification input. The high input is applied for use with the HiMP tape that is identified with the ID holes on cassette.</td></tr>
</table>

Table I-6(2/3) Terminal functions of main microcomputer (IC001)

Terminal	Signal designation	I/O	Function
36	SERVICE MODE Ⓛ	I	The service mode is changed each time the low input is applied. NORMAL → 1 → 2 → 3 → 4 → 5 → 6 → 7 → NORMAL .....
37	E5 DET	I	EVER 5V detecting terminal. Used to detect the presence/absence of main battery for microcomputer mode changeover. The microcomputer enters the standby mode when this signal goes low, and enters the sleep mode when it goes high.
38	MAIN-CS	I	Used for chip selection in serial data communication with the servo microcomputer (IC101). Serial data communication is carried out while this signal stays high.
39	S-CLOCK	O	Clock output for serial data communication with the servo microcomputer (IC101) and character generator 2 (IC308).
40	S-DATA OUT	O	Data output for serial data communication with the servo microcomputer (IC101) and character generator 2 (IC308).
41	S-DATA IN	I	Data input for serial data communication with the servo microcomputer (IC101).
42	REMOCON DATA	I	Input of data transmitted from the remote controller.
43	POWER SW ON Ⓛ	I	Power switch input. Goes low when the power switch is pressed.
44	SEL C	I	Model identification input terminal. Goes low for Model A1.
45	SEL D	I	Model identification input terminal. Goes high for Model A1.
46	TALLY	O	The tally LED is turned on when this signal goes low. In recording the tally LED blinks at each cycle of timer. The tarry LED lights up when the remote control signal is received.
47	POWER LED	O	The power LED is turned on when this signal goes low. The power LED lights up at power-on. For warning, it blinks at a cycle of one second.
48	WAKE UP Ⓛ	O	Servo microcomputer startup signal. The low-level pulse starts up the microcomputer.
49	C-OUT	O	Output of frequency-divided timer clocking.
50	K-IN0	I	Key matrix input. Key-make state at low level.
51	K-IN1	I	
52	EJECT SW ON Ⓛ	I	EJECT switch input. Goes low when the EJECT switch is pressed.
53	STOP SW ON Ⓛ	I	STOP switch input. Goes low when the STOP switch is pressed.
54	VDD	-	EVER 5V or LITHIUM 3V input.
55	XT1	I	Subclock oscillation for timer. Connected with the 32.76 MHz crystal oscillator.
56	XT2	O	
57	-	-	Unused.
58	X1	I	Main clock oscillation. Connected with the 4.19 MHz crystal oscillator.
59	X2	O	
60	TITLE/DATE SW Ⓛ	I	TITLE/DATE switch input. Goes low when the TITLE/DATE switch is pressed.
61	SHIFT SW Ⓛ	I	SHIFT switch input. Goes low when the SHIFT switch is pressed.
62	+ SW Ⓛ	I	'+' switch input. Goes low when the '+' switch is pressed.
63	- SW Ⓛ	I	'-' switch input. Goes low when the '-' switch is pressed.
64	TIMER SW Ⓛ	I	TIMER switch input. Goes low when the TIMER switch is pressed.
65	-	-	Unused.
66	SP/LP SW Ⓛ	I	Tape speed switch input. Goes low when the tape speed switch is pressed.
67	TRIGGER SW ON Ⓛ	I	TRIGGER switch input. Goes low when the TRIGGER switch is pressed.
68	RESET Ⓛ	I	Microcomputer resetting input to be applied when the lithium battery or 6V power supply is loaded alone. The microcomputer is reset during the low-level period of this signal that lags behind the leading edge of VDD.

Table I-6(3/3) Terminal functions of main microcomptuer (IC001)

Terminal	Signal designation	I/O	Function
69	S0	O	LCD segment drive terminals.
70	S1	O	
71	S2	O	
72	S3	O	
73	S4	O	
74	S5	O	
75	S6	O	
76	S7	O	
77	S8	O	
78	S9	O	
79	S10	O	
80	S11	O	

(4) Data communication

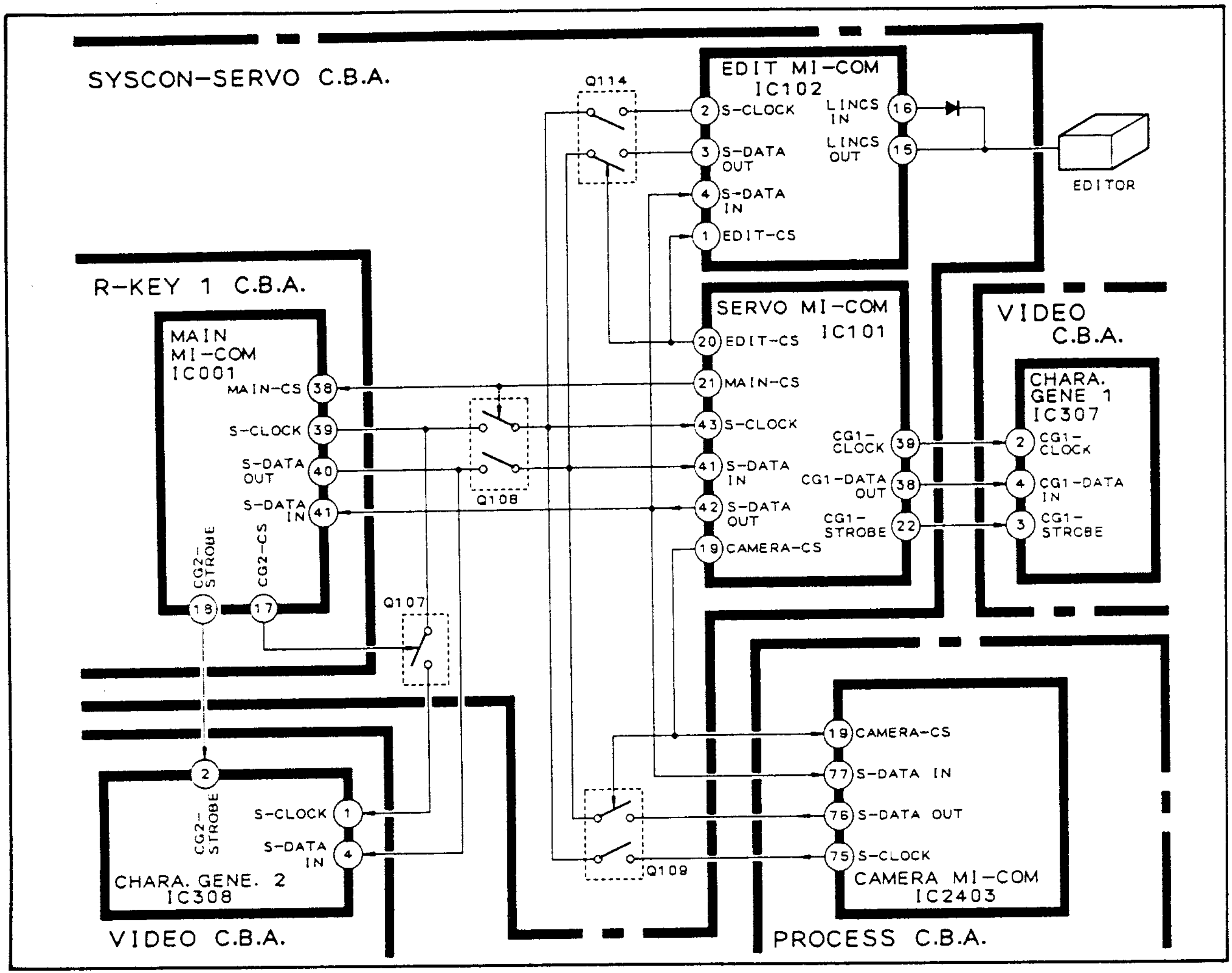

SYSCON-SERVO C.B.A.
Q114
EDIT MI-COM
IC102
2 S-CLOCK
3 S-DATA OUT
4 S-DATA IN
1 EDIT-CS
LINCS IN 16
LINCS OUT 15
EDITOR
R-KEY 1 C.B.A.
MAIN MI-COM IC001
MAIN-CS 38
S-CLOCK 39
S-DATA OUT 40
S-DATA IN 41
CG2-STROBE 18
CG2-CS 17
Q108
Q107
SERVO MI-COM
IC101
20 EDIT-CS
21 MAIN-CS
43 S-CLOCK
41 S-DATA IN
42 S-DATA OUT
19 CAMERA-CS
CG1-CLOCK 39
CG1-DATA OUT 38
CG1-STROBE 22
VIDEO C.B.A.
CHARA. GENE 1
IC307
2 CG1-CLOCK
4 CG1-DATA IN
3 CG1-STROBE
2 CG2-STROBE
S-CLOCK 1
S-DATA IN 4
CHARA. GENE. 2
IC308
VIDEO C.B.A.
Q109
19 CAMERA-CS
77 S-DATA IN
76 S-DATA OUT
75 S-CLOCK
CAMERA MI-COM
IC2403
PROCESS C.B.A.

Fig. I-26

In this camcorder, the following two serial data communications are carried out:

1) Bidirectional communication between the servo microcomputer and each microcmputer (main, camera, edit microcomputer).
2) Unidirectional communication from the servo microcomputer to character generator 1 and from the main microcomputer to the character generator 2.

① Bidirectional communication between servo microcomputer and each microcomputer

In the bidirectional communication between the servo microcomputer and each of the main, camera and edit microcomputers, control are all conducted by the servo microcomputer.

When communication with the main microcomputer is required, the servo microcomputer outputs the MAIN-CS (H) signal from pin 21 of IC101 to indicate a communication request to the main microcomputer. It also sets up a communication line by turning on Q108. Then, the main microcomputer sends the serial clock (pin 39) and serial data (pin 40) to the servo microcomuter, and receives the serial data at pin 41 from the servo microcomputer.
In the same fashion, by issuing the EDIT-CS signal from pin 20 of IC101 and the CAMERA-CS signal from pin 19 of IC101, the servo microcomputer interchanges data with the edit microcomputer and camera microcomputer, respectively.
The servo microcomputer controls the CS signal so that communication with each microcomputer is carried out per 1V interval while preventing overlap of the communication durations. The serial data appearing at pin 42 of IC101 is available for communication with each of the main, camera and edit microcomputers. At each microcomputer, however, the serial data is assumed to be valid only while the CS signal remains high.

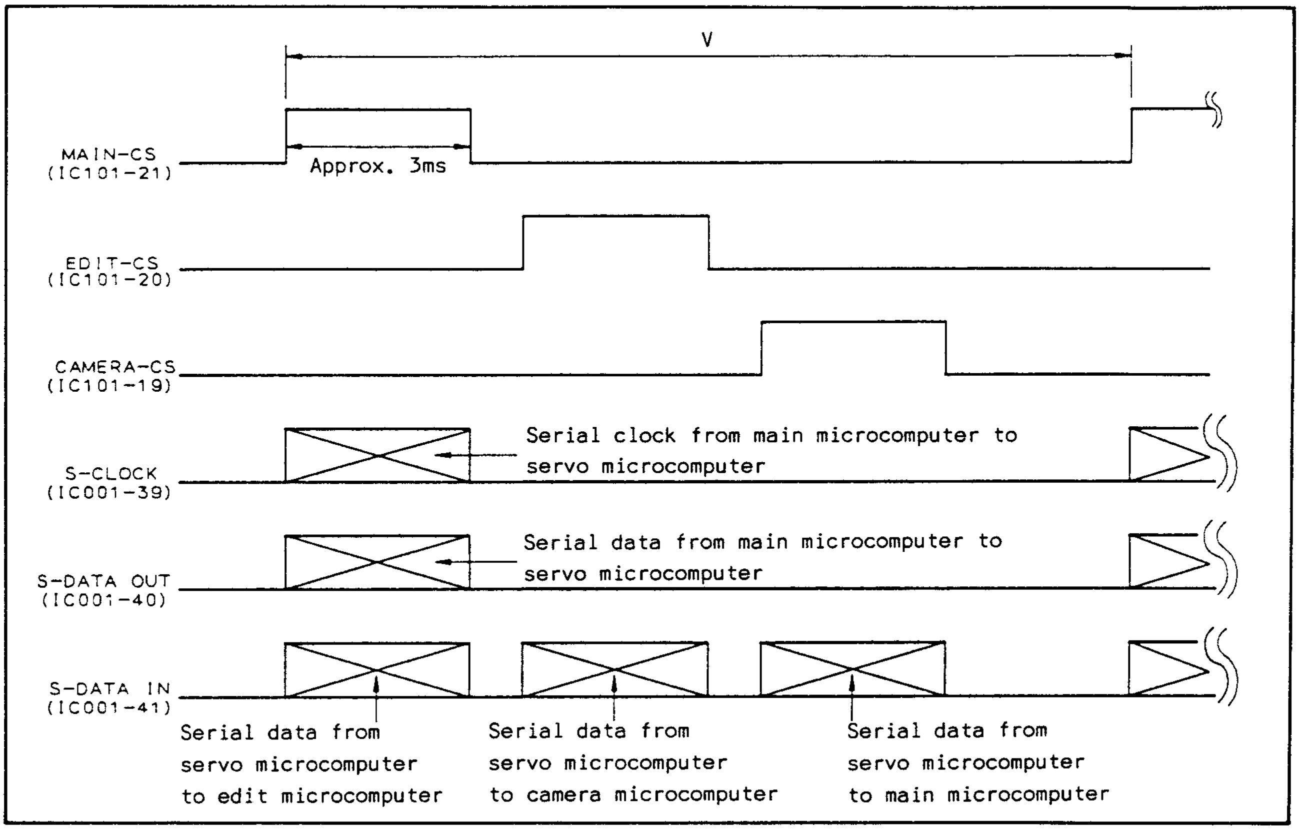

V
MAIN-CS (IC101-21)
Approx. 3ms
EDIT-CS (IC101-20)
CAMERA-CS (IC101-19)
S-CLOCK (IC001-39)
Serial clock from main microcomputer to servo microcomputer
S-DATA OUT (IC001-40)
Serial data from main microcomputer to servo microcomputer
S-DATA IN (IC001-41)
Serial data from servo microcomputer to edit microcomputer
Serial data from servo microcomputer to camera microcomputer
Serial data from servo microcomputer to main microcomputer

Fig. I-27

② Unidirectional communication from servo microcomputer to character generator 1 and from main microcomputer to character generator 2

Independent unidirectional communication is carried out from the servo microcomputer to the character generator 1 and from the main microcomputer to the character generator 2. The servo microcomputer sends the CG1-CLOCK signal (pin 39) and CG1-DATA signal (pin 38) to the charcter generator 1 (IC307). In this communication, the data is judged valid when the CG1-STROBE signal is high.
In the same manner, the main microcomputer furnishes data to the character generator 2. Since the S-CLOCK signal appearing at pin 39 of the main microcomputer IC001 is also used as a clock output for communication with the servo microcmputer, the CG2-CS signal (pin 17) is turned high to trigger on Q107 only for communication from the main microcomputer to character generator 2.

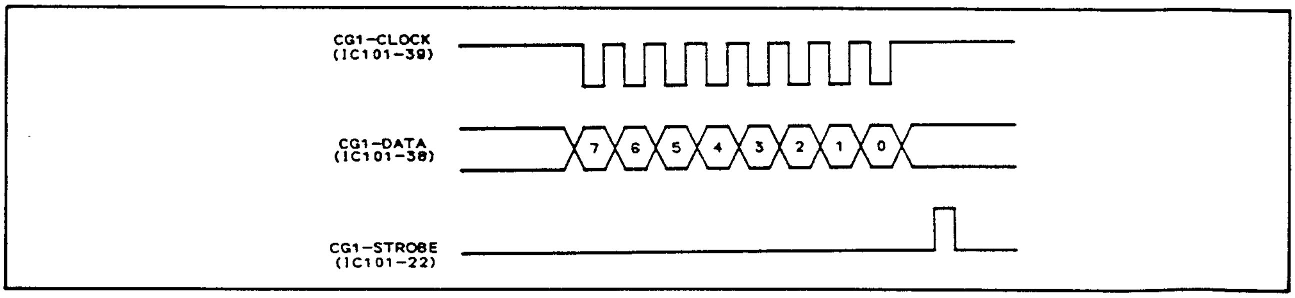

CG1-CLOCK (IC101-39)
CG1-DATA (IC101-38)
7
6
5
4
3
2
1
0
CG1-STROBE (IC101-22)

Fig. I-28

* In addition, where the easy-editing unit is connected to the EDIT terminal, the LINCS bidirectional communication is performed with pins 15 and 16 of the edit microcomputer IC102 to permit operation of the easy-editing function.

(5) Safety functions

To prevent a physical damage or jamming of tape due to improper setting, the Model A1 carries out the warning indication processing, key-input rejection, or operational restriction as stated below.

① Detection of battery voltage drop

The following three low levels of main battery are detectable during operation.

(UNDERCUT1)
When the voltage level at main battery terminal decreases below 5.53 V, the POWER LED indicator blinks and the "BATTERY" warning message appears on the EVF screen. Also, the "BATT" flashes on the LCD. Under this condition, the key-input and operation are not restricted (the normal operation is allowed). However, once the camcorder is stopped, other keys than the POWER and EJECT keys become nonfunctional.
If UNREG 6V power decreases below the predetermined voltage level, the low-voltage-level detecting singal at pin 45 of the servo microcomputer goes low and the UNDERCUT1 signal is recognized in the microcomputer. then, with the CG1-DATA signal at pin 38, the warning message is displayed on the EVF screen. And, with the S-DATA OUT signal at pin 42, the servo microcomputer informs the main microcomptuer of the UNDERCUT1 state. Knowing this state, the main microcomputer flashes the LED with output at pin 47 and issues the warning indication on the LCD.

(UNDERCUT2)
If the UNREG 6V power further decreases below 5.33 V, the powr-off state is taken automatically through the stop mode.
As in the same manner in UNDERCUT1 condition, the low voltage level is detected in the servo microcomputer. Upon detection of the low voltage level of less than 5.33 V, the servo microcomputer drives the loading motor to set the mechanisms to the stop position. Then, it turns of each power control signal.

(SHUT OFF)
If the main battery voltage drops rapidly below 4.5 V, the reset IC106 outputs the low-level signal for resetting the servo microcomputer. And, the power is turned off immediately.

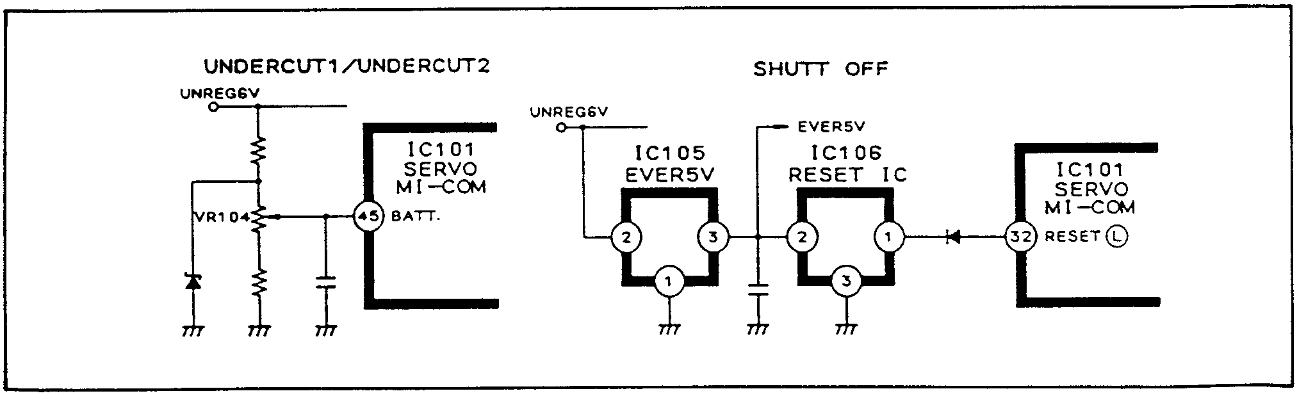


Fig. I-29

② Low-lithium-level detection

When the voltage level at lithium battery terminal decreases below approx. 2.7 V, the IC002 comparator outputs the low-level signal to inform the main microcomputer that the lithium battery is getting weak. Knowing this condition, the main microcomputer blinks "DATE BATT" on the LCD and also indicates the relevant data to the servo microcomputer. Upon receipt of this data, the servo microcomputer flashes the "DATE" message on the EVF screen for the purpose of warning.

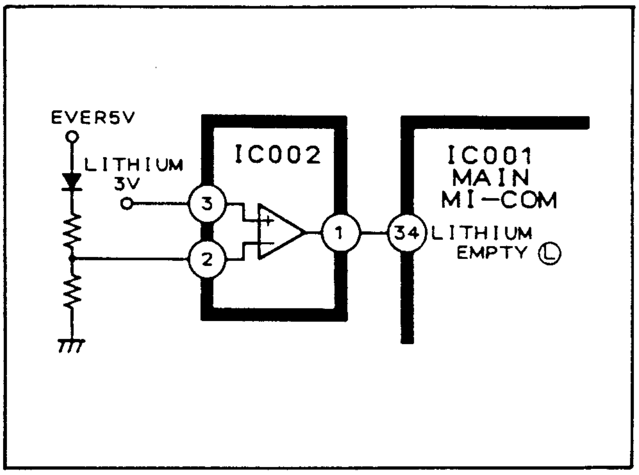


Fig. I-30

③ Dew condensation

The moisture condensation (dew) detecting function is provided to circumvent jamming of tape due to possible sticking.

If moisture condensation is detected during operation, the mechanism is put in the stop mode and the power LED indicator blinks for warning. Also, 'd' flashes on the LCD, and "DEW" blinks on the EVF screen. Under this condition, other than the POWER and EJECT keys become nonfunctional. Even if the tape cassette is inserted, the loading operation is not carried out. When dew condensation is removed, the camcorder enters the stop mode to be ready for normal operation.

In dew condensation state, the DEW sensor equipped on the mechanical chassis increases its resistance to increase the DEW detection voltage level input to pin 44 of the servo microcomputer. If this level rises above the predetermined value, the microcomputer judges that dew condensation has occurred. Then, the microcomputer carries out the mode transition and warning indication.

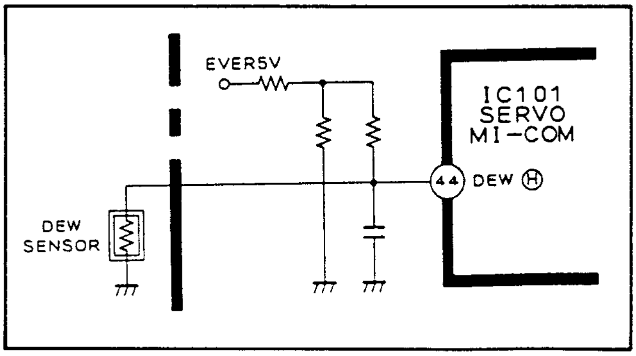


Fig. I-31

(DEW EJECT)
If the tape sticks to the drum, it cannot be run only with the takeup reel. In this event, the supply reel is used also. Upon detection of dew condensation, the eject sequence (DEW EJECT) is carried out as indicated in the Fig. I-32.

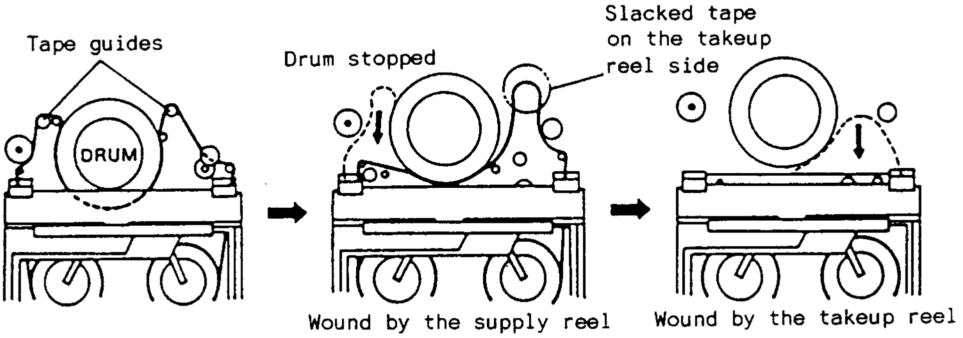

Tape guides
DRUM
Drum stopped
Slacked tape on the takeup reel side
Wound by the supply reel
Wound by the takeup reel

Fig. I-32

④ End-of-tape check

If the video tape is run up to its end, the tape guide may be damaged or the head drum is secured with tape. To prevent such an event, the end-of-tape check is conducted to detect the end of tape during operation. If the end of tape is detected, the tape is stopped immediately.

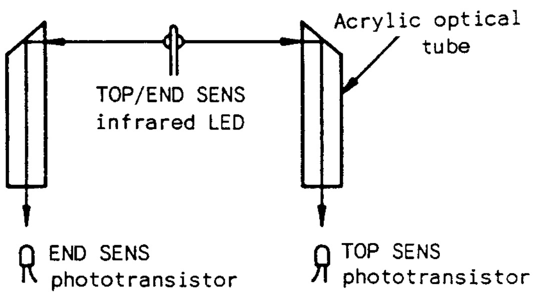

Acrylic optical tube
TOP/END SENS infrared LED
END SENS phototransistor
TOP SENS phototransistor

Fig. I-33

The end-of-tape detecting LED is turned on/off with the signal appearing at pin 27 of the servo microcomputer IC101. It constantly flashes in a cycle of 1 msec. If the signal across pins 55 and 56 goes low twice in succession, the microcomputer recognizes the end of tape to top the mechanism. Also, if the EOT and BOT input signals go low twice in succession at the same time, the microcomputer judges that the cassette is not loaded. In this case, "CASSETTE" flashes on the EVF screen.

⑤ Pause timer

In the REC PAUSE or STILL mode, the drum rotates with tape wound around it. If this condition persists for a long period of time, the tape may wear or the head may be clogged. To prevent this, when the REC PAUSE state is kept for seven minutes, the mechanism is forced to the stop position and the power goes off. Also, when the STILL state is kept for seven minutes, the mechanism is forced to the stop position but the power remains on.

⑥ Trouble stop (error)

Upon detection of an error, the servo microcomputer (IC101) puts the mechanism in the stop state. Then, only the POWER and EJECT keys are usable. The error condition can thus be reset. In the event of trouble, the power LED indicator, the "EJECT" message on viewfinder screen, and the EJECT mark on LCD blink for warning.

Table I-7 Trouble stop (error) detection

Event		State	Detection
During normal operation	Drum error	An error is issued if the drum speed decreases below approx. 28% of the normal rotation level. (For approx. 100 mS)	Pin 61 of IC101; D-FG
	Capstan error	An error is issued if the capstan speed decreases below approx. 6% of the normal rotation level. (For approx. 100 mS)	Pin 62 of IC101; C-FG
At startup	Drum error	An error is issued if the drum speed decreases below approx. 34% of the normal rotation level in five seconds after output of the DRUM PWM signal. (204 Hz: Equivalent to approx. 34% speed in the play mode)	Pin 61 of IC101; D-FG; Internal timer
	Capstan error	An error is issued if approx. 75% of the normal rotation speed is not obtained in two seconds after output of the CAPSTAN ON H signal. (Undetectable in FF/FR)	Pin 62 of IC101; C-FG Internal timer
Reel error		° In the FF/REW mode, an error is indicated if the reel speed decreases below approx. 20% of the maximum rotation level. (Immediately)	Pins 46 and 47 of IC101 In forward drive: T-REEL FG In reverse drive: S-REEL FG
		° In other modes than FF/REW, an error is indicated if the reel speed decreases below 50% of the maximum rotation level. (Immediately)	
Loading motor safety timer		An error is issued if the switch does not changes within the predetermined period of time as follows. (Mode transition operation: Three seconds Load/unload oepration : Five seconds)	Timer in IC101; Mode switch input for pins 24 to 26

⑦ Full-top loading

To prevent the beginning of tape from getting onto the drum upper surface in loading, the following special sequence is performed upon detection of the beginning of tape after the cassette is inserted.
The takeup reel tenses the tape first, and then the drum motor is run in reverse slightly for approx. one second. This causes the claw on the upper drum to tap the tape off from the drum. And, reverse braking is applied to the drum motor to wind the tape on the takeup reel again. Thereafter, the normal loading sequence is carried out.

(6) Other functions

① Linear time tape counter

The linear time tape counter is provided in Model A1. It indicates a tape drive time in seconds. Since the tape is squeezed between the pinch roller and the capstan, the raw signal of tape counter is produced with the capstan frequency generator. Thereby, extremely high accuracy is achieved in tape counting.

(In recording)
When the capstan motor runs, the C-FG is 1325 Hz (LP: 663 Hz). The servo microcomputer IC101 recognizes 'one second' upon receiving this 948 C-FG pulses input to pin 62.

(In playback)
If the C-FG output varies during the playback operation, an error may take place in tape counting. To prevent this, instead of direct C-FG counting, the number of C-FG pulses per 25 frames (one second) is counted and stored into memory. Then, when the memorized number of C-FG pulses is reached, the microcomputer recognizes 'one second'. Also, in a certain cycle, it checks if the memorized number of C-FG pulses is correct or not.

② STILL/SLOW/F-ADV mode

In the still playback mode, only the f1, f2 and f3 fields corresponding to ATF pilot can be stopped because of the azimuth design of head. So, in the slow or frame advance playback mode, the capstan is driven intermittently to feed the tape on a frame-by-frame basis.

In the figure show below, ① indicates the still state in which the f1 or f3 field is traced with the CH-1 and CH-1' heads alternately. At step ②, the tape starts running. Then, at step ③, the approximate level of normal playback speed is reached and the f2 or f4 field is traced with the CH-2 head. At step ④, the f3 and f1 field is traced with the CH-1 head and the tape starts stopping. The tape still state is attained again at step ⑤. Thus, the slow motion or frame-advance pictures are played back by repeating the above sequence.

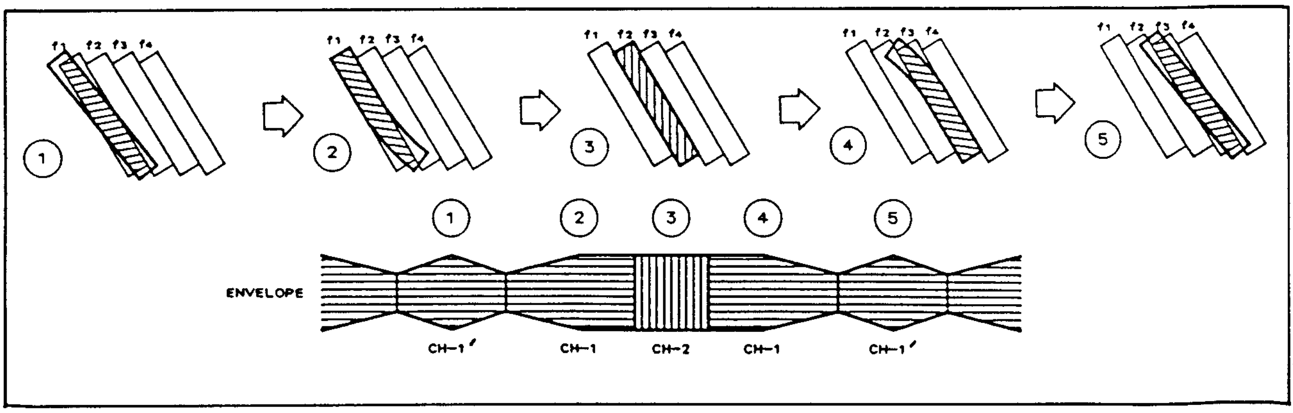


Fig. I-34

3-3-2 Servo circuit

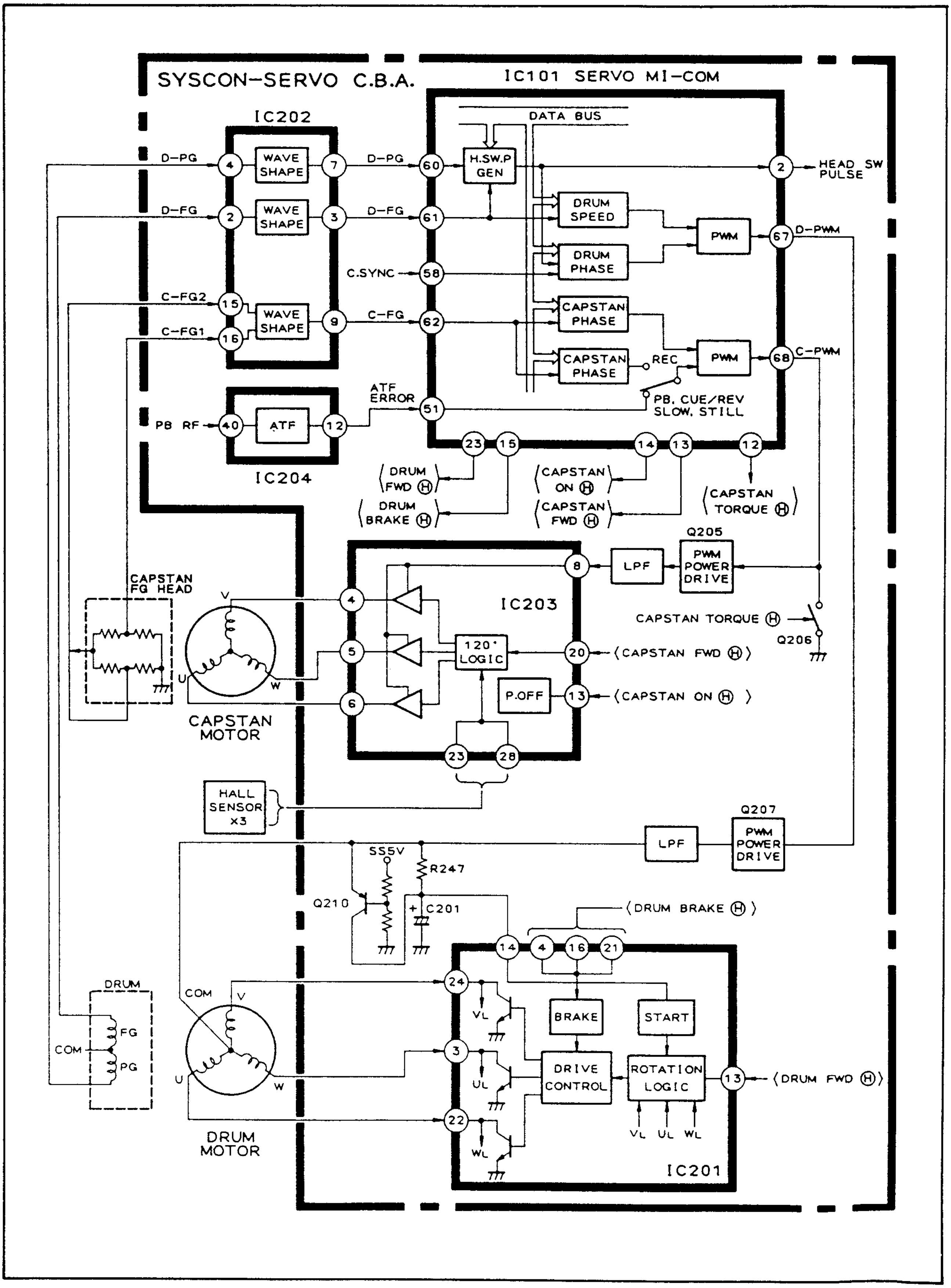

SYSCON-SERVO C.B.A.
IC101 SERVO MI-COM
IC202
DATA BUS
D-PG
WAVE SHAPE
H.SW.P GEN
HEAD SW PULSE
D-FG
DRUM SPEED
DRUM PHASE
PWM
D-PWM
C.SYNC
C-FG2
C-FG1
C-FG
CAPSTAN PHASE
REC
C-PWM
ATF ERROR
PB. CUE/REV SLOW, STILL
PB RF
ATF
IC204
DRUM FWD Ⓗ
DRUM BRAKE Ⓗ
CAPSTAN ON Ⓗ
CAPSTAN FWD Ⓗ
CAPSTAN TORQUE Ⓗ
Q205
PWM POWER DRIVE
LPF
CAPSTAN FG HEAD
IC203
120° LOGIC
P.OFF
CAPSTAN TORQUE Ⓗ
Q206
CAPSTAN MOTOR
HALL SENSOR x3
Q207
SS5V
R247
Q210
C201
DRUM
FG
PG
COM
BRAKE
START
DRIVE CONTROL
ROTATION LOGIC
VL UL WL
IC201
DRUM MOTOR

Fig. I-35

The drum and capstan servoloops are controlled under direction of the servo microcomputer IC101 mounted on SS circuit board. So, the external servocontrol circuit is not provided in Model A1. The software servocontrol function is carried out by the servoloop hardware contained in IC.

(1) Drum servocontrol

The minuscule outputs from the FG and PG coils equipped on the drum motor is subjected to waveform shaping in IC202 to provide logical levels (0 to 5V). Then, the logical-level signals are input to the servo microcomputer. In recoridng/playback, the D-FG signal has a frequency of 600 Hz under normal condition. And, two pulses of D-PG are output per one rotation of the drum

On receipt of the logical-level signals, the servo microcomputer carries out speed servocontrol and phase servocontrol and then outputs the D-PWM signal from pin 67. The D-PWM signal is subjected to power driving by Q207 to produce the PWM signal. It is passed through the LPF to provide DC voltage. This DC voltage is applied to the common terminal of motor. The D-PWM signal is also used to start up the motor.

The U/V/W switching of motor is conducted with the signals appearing from pins 3, 22 and 24 of the motor drive circuit (IC201). The counter e.m.f. voltage of motor is detected for switch timing control. For this purpose, pin 14 is assigned to receive input.

In full-top loading state, the DRUM BRAKE Ⓗ signal is used to apply sharp braking when changing drum rotation from the reverse direction to the forward direction. For this sequence, the signals appearing from pins 4, 16 and 21 are used and the three-phase switching power transistors are turned on simultaneously. To rotate the drum in reverse, the DRUM FWD Ⓗ signal is turned to low.

(2) Capstan servocontrol

The FG1 signal from the capstan motor and the FG2 signal having the reverse phase are subjected to waveform shaping by the IC202. Then, these signals are frequency-multiplied (doubled) respectively to provide logical-level inputs to the servo microcomputer. In recording, the frequency is 1325 Hz (LP: 663 Hz). On receipt of the input signals, the servo microcomputer carries out speed servocontrol and phase servocontrol. For the playback operation, the ATF ERROR signal input to pin 51 is used to conduct phase servocontrol. As in the drum servocontrol sequence, the C-PWM signal (result of servocontrol) is output from pin 68 and then subjected to power driving with Q205. Then, after passing through the LPF, the DC voltage is input to pin 8 of the motor drive circuit (IC203) and applied to each of motor phases U, V and W.

For the U/V/W switching of motor, the three Hole elements are used to detect the rotor position. Thus, the switching operation is controlled.

To start the motor, the CAPSTAN ON Ⓗ signal is used in the normal operation. But, in the SLOW playback mode, only the C-PWM signal is used for motor drive control.

The capstan motor is braked sharply in the following cases:

① The end or beginning of tape is detected in the fast forward/rewind operation.
② The F-ADV or SLOW playback is performed.

For this purpose, the CAPSTAN TORQUE Ⓗ signal is output and also the CAPSTAN FWD Ⓗ signal is turned low to apply reverse braking.

3-3-3 Video circuit

In the recorder section of the A1, the ICs which are used in the VM-E1, E2 etc. are used. Also, as the same as the E708, the circuits are configurated so as to match with the double azimuth 3-head system.

(1) Recording circuit

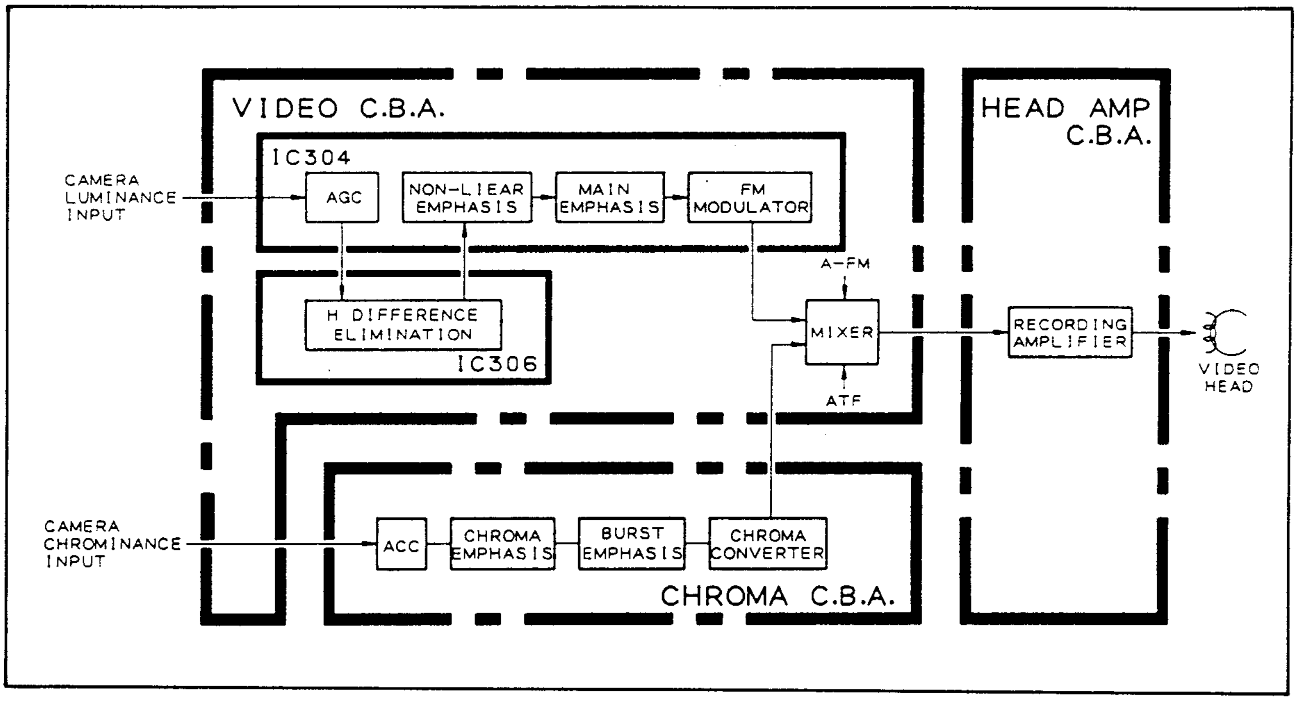

VIDEO C.B.A.
IC304
CAMERA LUMINANCE INPUT
AGC
NON-LIEAR EMPHASIS
MAIN EMPHASIS
FM MODULATOR
A-FM
H DIFFERENCE ELIMINATION
IC306
MIXER
ATF
HEAD AMP C.B.A.
RECORDING AMPLIFIER
VIDEO HEAD
CAMERA CHROMINANCE INPUT
ACC
CHROMA EMPHASIS
BURST EMPHASIS
CHROMA CONVERTER
CHROMA C.B.A.

Fig. I-36

In normal recording operation, the signal processing is categorized into the luminance and chrominance signal processings. As the input signal from the camera section is separated into the luminance and chrominance signals already, it is not required to route the camera input signal through the Y/C separation circuit.
Each input signal is passed to the signal processing circuit of succeeding stage.

The luminance signal is processed on the VIDEO CBA. The chrominance signal is processed on the CHROMA CBA and then mixed with the luminance signal on the VIDEO CBA. Then the mixed signal is fed to the HEAD AMP CBA together with other audio and ATF signals. At this stage, the recording amplifier function is provided to record signals on a tape, and the recorded signals are given to the video head through the rotary transformer.

① Luminance signal circuit

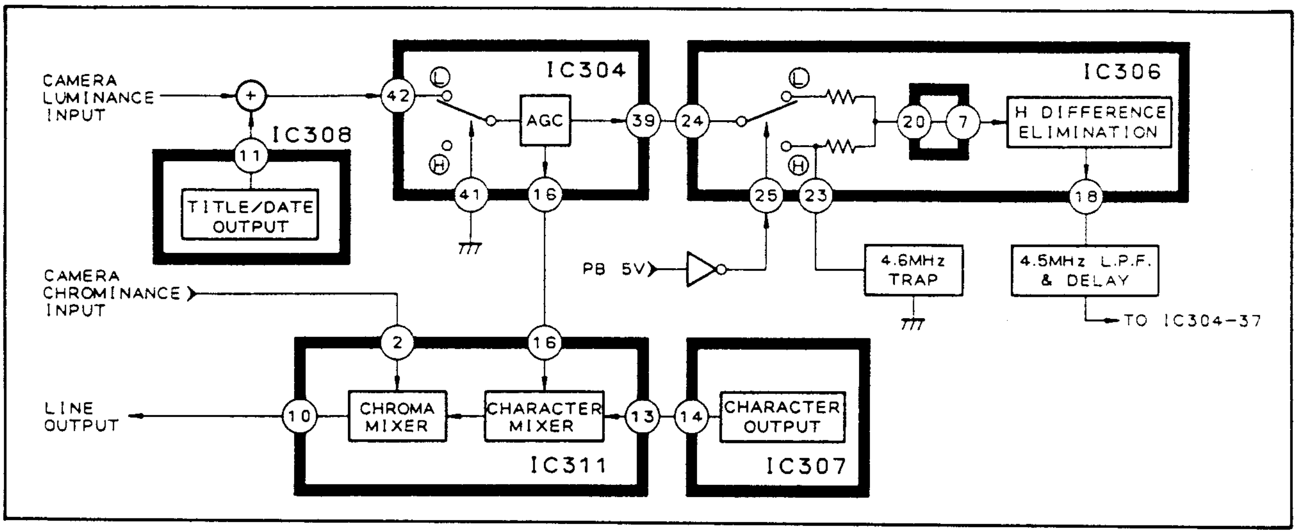

CAMERA LUMINANCE INPUT
IC308
11
TITLE/DATE OUTPUT
CAMERA CHROMINANCE INPUT
LINE OUTPUT
IC304
42
Ⓛ
Ⓗ
AGC
39
41
16
IC306
24
Ⓛ
Ⓗ
20
7
H DIFFERENCE ELIMINATION
25
23
18
PB 5V
4.6MHz TRAP
4.5MHz L.P.F. & DELAY
TO IC304-37
2
16
10
CHROMA MIXER
CHARACTER MIXER
13
IC311
14
CHARACTER OUTPUT
IC307

Fig. I-37

The camera luminance input signal is applied to pin 42 of IC304 through the TITLE/DATE and the MIX circuits. After passing through the internal switch of IC, it is fed to the AGC circuit so as to make its level constant. Then, it is output from pin 39. Thereafter, it is input to pin 24 of IC306. In the normal recording mode, the high frequency component is eliminated through the 4.6 MHz trap. After H difference elimination, it is output from pin 18. Through the 4.5 MHz low pass filter, the band-width is limited for routing to the modulation circuit next stage.

The line output signal is output from pin 10 after the character signal and the chrominance signal are mixed in IC311.

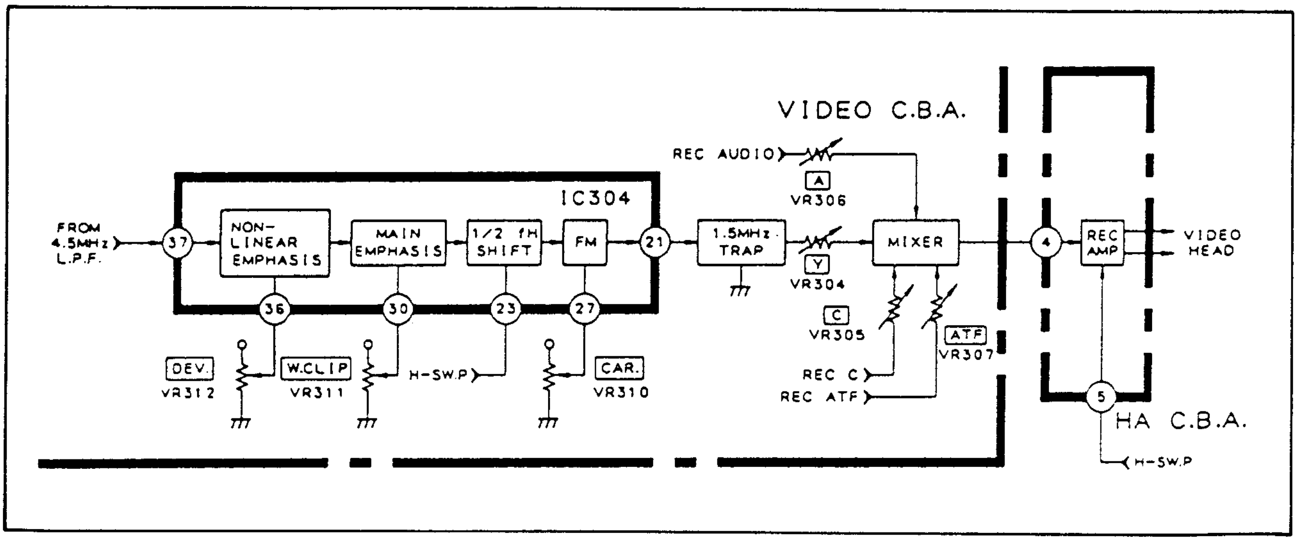

VIDEO C.B.A.
REC AUDIO
A
VR306
IC304
FROM 4.5MHz L.P.F.
37
NON-LINEAR EMPHASIS
MAIN EMPHASIS
1/2 fH SHIFT
FM
21
1.5MHz TRAP
Y
VR304
MIXER
C
VR305
ATF
VR307
REC C
REC ATF
36
30
23
27
DEV.
VR312
W.CLIP
VR311
H-SW.P
CAR.
VR310
4
REC AMP
VIDEO HEAD
5
HA C.B.A.
H-SW.P

Fig. I-38

The luminance signal input to pin 37 of IC304 is subjected to the non-linear emphasis, main emphais, 1/2 fH shifting etc., and it is frequency-modulated. Then, it is output from pin 21 as the FM luminance signal. The preset values of each circuit are adjustable using the variable resistors connected with each terminals. The frequency-modulated luminance signal is fed to the 1.5 MHz trap to eliminate its low carrier portion (audio FM signal band-width is center). This elimination is made to prevent the Y-FM signal from effecting on the chrominance and A-FM signal etc.

Then, the processed signal is mixed with the chrominance, audio and ATF signals, and supplied to the video head through the recording amplifier on the HEAD AMP CBA.

② Chrominance signal

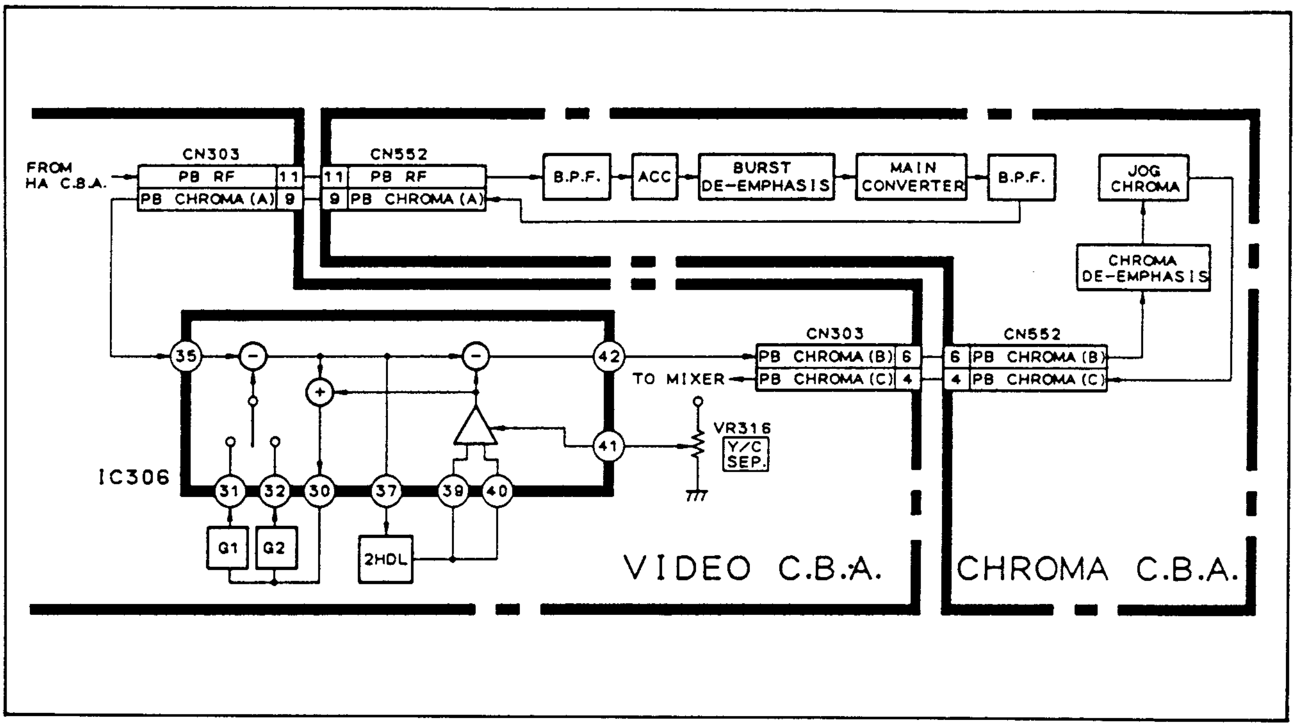

FROM HA C.B.A.
CN303
PB RF
11
PB CHROMA (A)
9
CN552
11
PB RF
9
PB CHROMA (A)
B.P.F.
ACC
BURST DE-EMPHASIS
MAIN CONVERTER
B.P.F.
JOG CHROMA
CHROMA DE-EMPHASIS
CN303
PB CHROMA (B)
6
TO MIXER
PB CHROMA (C)
4
CN552
6
PB CHROMA (B)
4
PB CHROMA (C)
35
42
41
IC306
31
32
30
37
39
40
Q1
Q2
2HDL
VR316
Y/C SEP.
VIDEO C.B.A.
CHROMA C.B.A.

Fig. I-39

The camera chrominance input signal is divided into two routes on the VIDEO CBA. The one signal is applied to the recording signal processing circuit on the CHROMA CBA. The other signal is fed to the video output terminal after mixed with the luminance signal on the E-E output circuit.

The recording signal is processed on the CHROMA CBA.
The input signal from pin 7 of CN303 is fed to ACC, emphasizer low-frequency converter, etc. Then, the processed signal is mixed with the luminance signal on the VIDEO CBA, and applied to the video head.

The E-E chrominance signal is input to pin 1 of IC309. Then, through the REC/PB and the mute switches, it is output from pin 7, and after mixed with the luminance signal in IC311, it is output from pin 10 as the line output video signal.

(2) Playback circuit

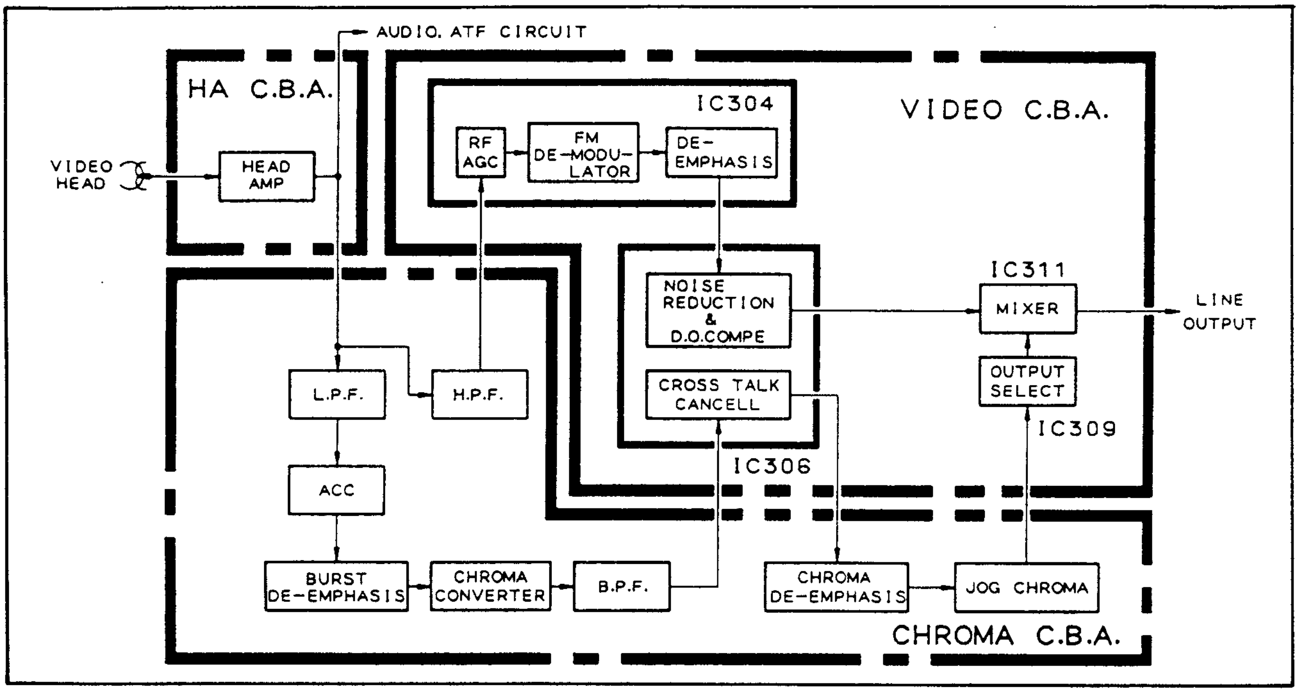

AUDIO. ATF CIRCUIT
HA C.B.A.
VIDEO HEAD
HEAD AMP
IC304
RF AGC
FM DE-MODU-LATOR
DE-EMPHASIS
VIDEO C.B.A.
NOISE REDUCTION & D.O.COMPE
CROSS TALK CANCELL
IC306
IC311
MIXER
LINE OUTPUT
OUTPUT SELECT
IC309
L.P.F.
H.P.F.
ACC
BURST DE-EMPHASIS
CHROMA CONVERTER
B.P.F.
CHROMA DE-EMPHASIS
JOG CHROMA
CHROMA C.B.A.

Fig. I-40

The signal read through the video head is amplified through the HEAD AMP CBA, and then fed to the CHROMA CBA. Each signal is taken out through the filters. The luminance signal is processed on the VIDEO CBA, and the chrominance signal is processed on the CHROMA CBA. Then, each signal is mixed and delivered to the line output terminal.

① Luminance signal

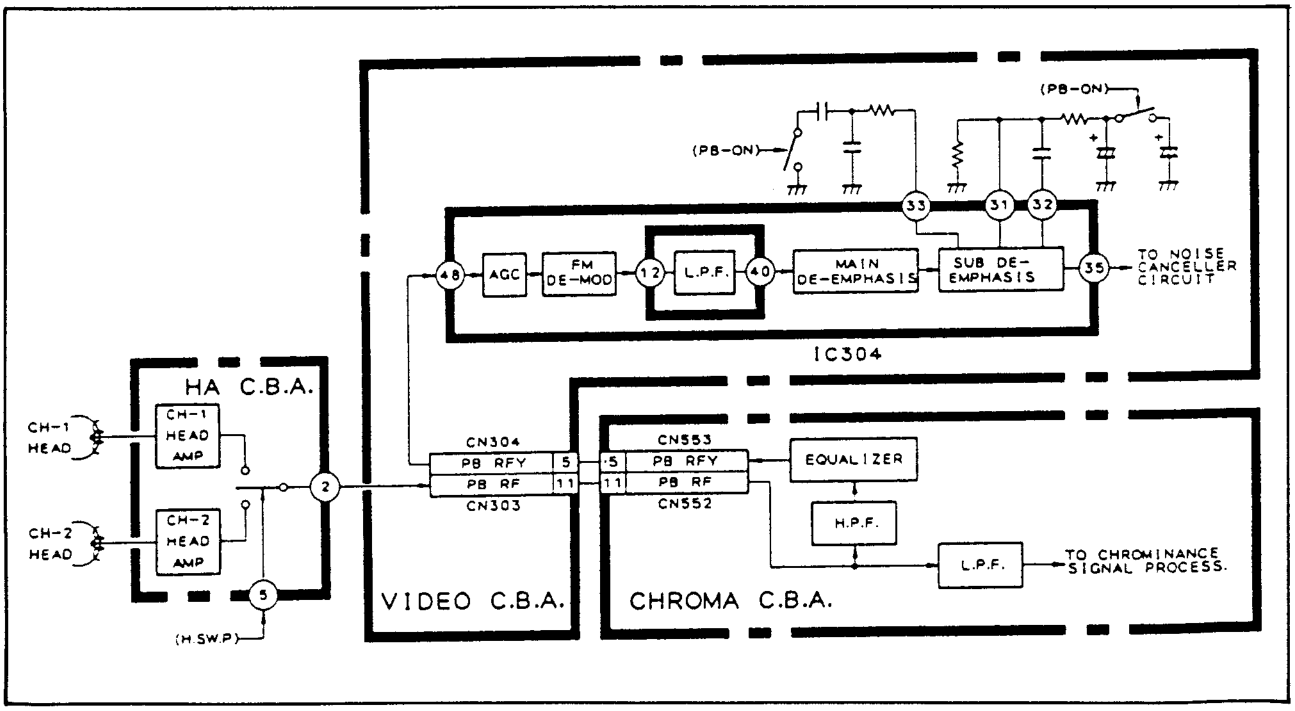

(PB-ON)
(PB-ON)
33
31
32
48
AGC
FM DE-MOD
12
L.P.F.
40
MAIN DE-EMPHASIS
SUB DE-EMPHASIS
35
TO NOISE CANCELLER CIRCUIT
IC304
HA C.B.A.
CH-1 HEAD
CH-1 HEAD AMP
CH-2 HEAD
CH-2 HEAD AMP
2
5
(H.SW.P)
CN304
PB RFY 5
PB RF 11
CN303
CN553
5 PB RFY
11 PB RF
CN552
EQUALIZER
H.P.F.
L.P.F.
TO CHROMINANCE SIGNAL PROCESS.
VIDEO C.B.A.
CHROMA C.B.A.

Fig. I-41

The playback video signal amplified on the HEAD AMP CBA is changed into the consecutive signal by the head switching pulse, and input to pin 2 of the VIDEO CBA. Through the buffer amplifier, it is output from pin 11 of CN303 to the CHROMA CBA. Then, the luminance signal component is taken out by the high pass filter. (At this stage, the frequency characteristic is flat, however, this characteristic is corrected by the equalizing circuit next stage.)

The playback RF luminance signal corrected its frequency characteristic is output from pin 5 of CN304, and input to the VIDEO CBA again. Then, it is fed to pin 48 of IC304. In IC304, it is subjected to RF AGC, and output from pin 12 after frequency demodulation. The demodulated output signal is band-limited by the 3.7 MHz low pass filter, and then, the amplitude and the phase characteristic are corrected at the equalizing circuit next stage.

Then, the signal is input to pin 40 of IC304, and the high frequency portion (emphasized by the de-emphasis circuit at recording) is decreased for attenuating the noise component. The attenuated signal is output from pin 35.

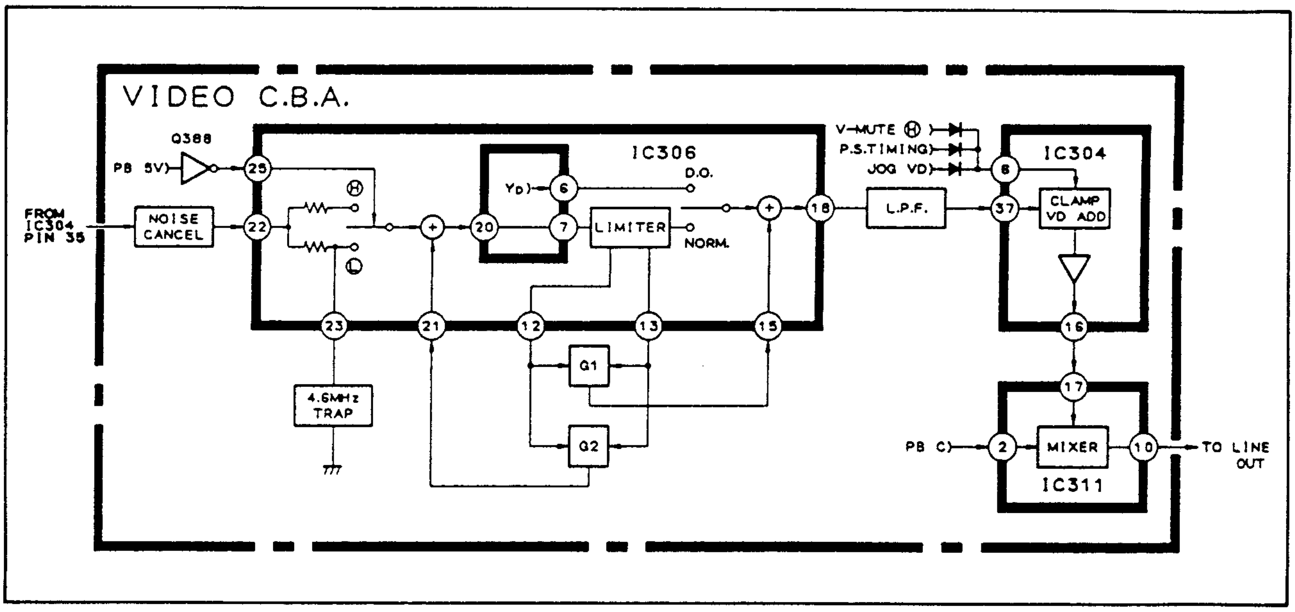

VIDEO C.B.A.
Q388
PB 5V
FROM IC304 PIN 35
NOISE CANCEL
25
22
H
L
IC306
D.O.
YD
6
7
20
LIMITER
NORM.
18
23
21
12
13
15
Q1
Q2
4.6MHz TRAP
V-MUTE H
P.S.TIMING
JOG VD
L.P.F.
IC304
8
37
CLAMP VD ADD
16
17
PB C
2
MIXER
10
IC311
TO LINE OUT

Fig. I-42

After de-emphasized, the luminance signal is eliminated its noise component by the noise canceller, and input to pin 22 of IC306. The signal is output from pin 20, and input from pin 7 again. Then, the signal is output from pin 18 as the crosstalk-free playback luminance signal.

Next, the signal is fed to pin 37 of IC304 through the 4.5 MHz low pass filter, and then output from pin 16 to the output circuit.
The signal input to pin 16 of IC311 is mixed with the chrominance signal from pin 2, and applied to the video output terminal from pin 10.

② Chrominance signal circuit

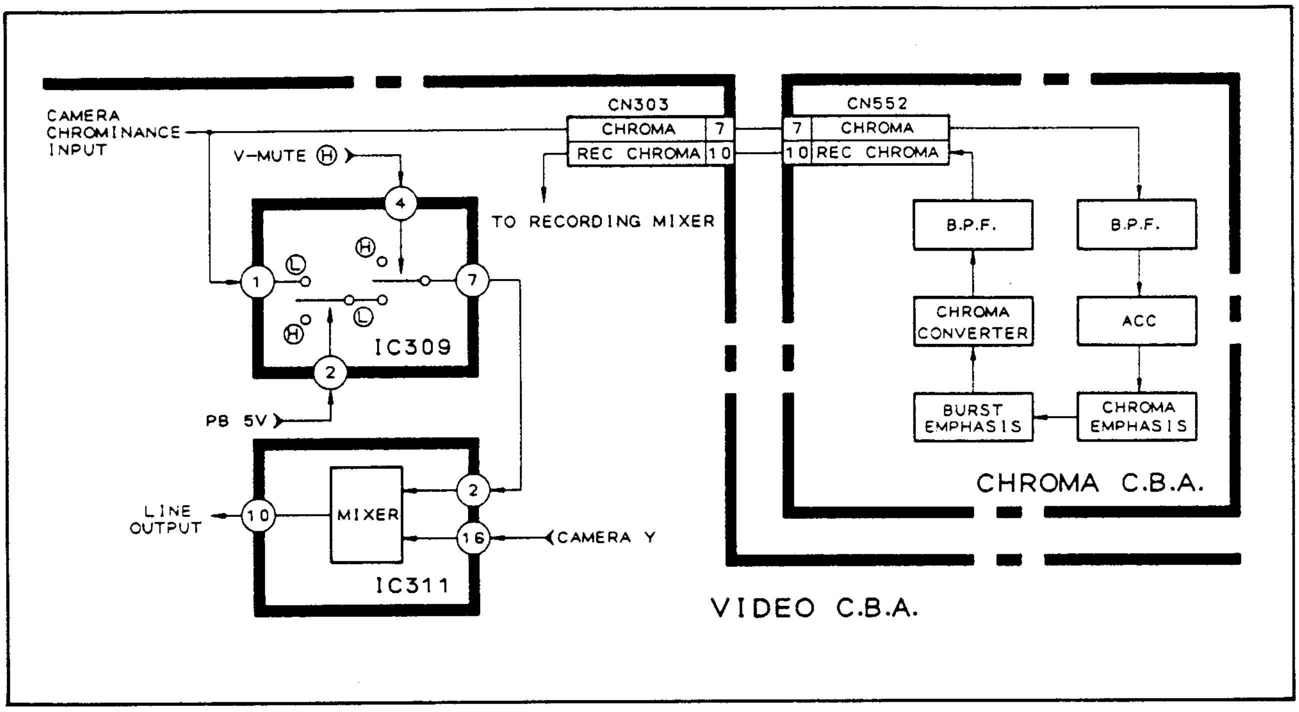

CAMERA CHROMINANCE INPUT
V-MUTE Ⓗ
CN303
CHROMA 7
REC CHROMA 10
TO RECORDING MIXER
CN552
7 CHROMA
10 REC CHROMA
B.P.F.
B.P.F.
CHROMA CONVERTER
ACC
BURST EMPHASIS
CHROMA EMPHASIS
CHROMA C.B.A.
IC309
PB 5V
LINE OUTPUT
MIXER
CAMERA Y
IC311
VIDEO C.B.A.

Fig. I-43

On the CHROMA CBA, the chrominance signal component is taken out from the playback RF signal which is applied from the head amplifier.
Next, after the playback chrominance signal processings, such as the ACC, frequency conversion, etc. are carried out, the signal is input from pin 9 of CN303 to be applied to the VIDEO CBA.

In the VIDEO CBA, the chrominance crosstalk component from the adjacent track is removed, and also the noise component having no line correlation is eliminated. The chrominance signal input to pin 35 of IC306 is subjected to correlation/non-correlation selection in the IC by using a comb filter to carry out the relevant oepration.
After noise elimination, the signal is output from pin 42 and applied to pin 6 of CN303 to be fed to the CHROMA CBA again.

Then, after the signal is subjected to the chroma de-emphasis, it is fed to the VIDEO CBA as a playback chrominance signal through the burst replacing switch. After mixed with the playback luminance signal, it is output.
At variable speed playback operation, the burst replacing, sequential detection, etc. are carried out so as to output the constant chrominance signal.

3-3-4 Audio circuit

(1) Recording circuit

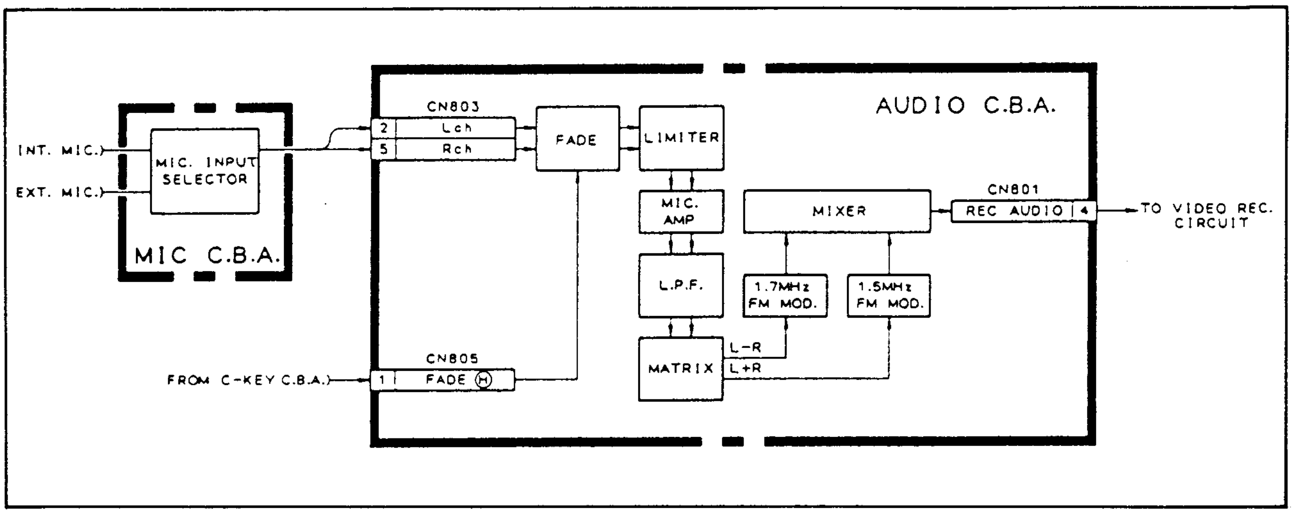

INT. MIC.
EXT. MIC.
MIC. INPUT SELECTOR
MIC C.B.A.
CN803
2 Lch
5 Rch
FADE
LIMITER
MIC. AMP
L.P.F.
MATRIX
L-R
L+R
1.7MHz FM MOD.
1.5MHz FM MOD.
MIXER
AUDIO C.B.A.
CN801
REC AUDIO 4
TO VIDEO REC. CIRCUIT
CN805
1 FADE Ⓗ
FROM C-KEY C.B.A.

Fig. I-44

One of the following two input signals is applied; internal stereo microphone input and external stereo microphone input.

On the MIC CBA, internal/external stereo microphone input selection is performed and the selected input is fed to the AUDIO CBA.

When the stereo microphone input is connected, it is passed through the microphone amplifier and then subjected to band limitation through the 15 kHz LPF. Then, addition/subtraction is performed in the matrix circuit to generate the L+R and L-R signals. Thereafter, the L+R signal is frequency-modulated at 1.5 MHz, and the L-R signal is frequency-modulated at 1.7 MHz. After frequency modulation, each signal is mixed and recorded as the audio signal on a tape together with the video signal.

(2) Playback circuit

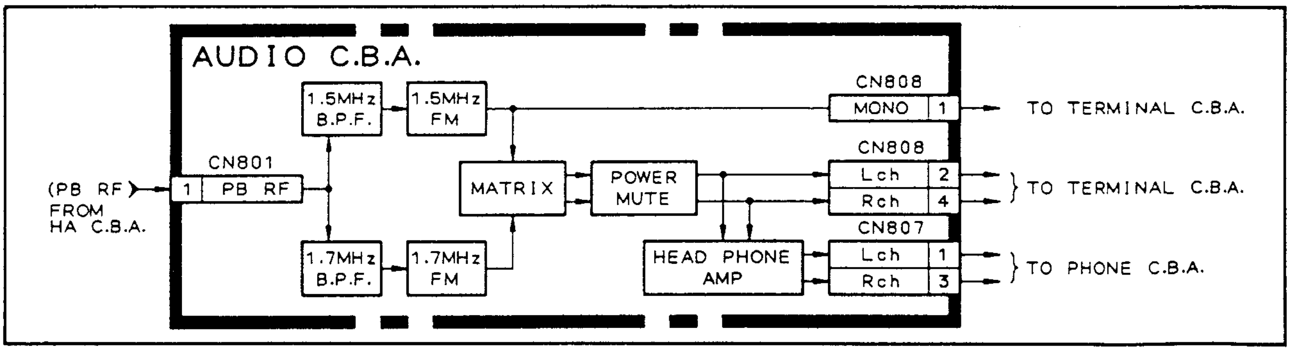

AUDIO C.B.A.
(PB RF) FROM HA C.B.A.
CN801
1 PB RF
1.5MHz B.P.F.
1.5MHz FM
1.7MHz B.P.F.
1.7MHz FM
MATRIX
POWER MUTE
HEAD PHONE AMP
CN808
MONO 1
TO TERMINAL C.B.A.
CN808
Lch 2
Rch 4
TO TERMINAL C.B.A.
CN807
Lch 1
Rch 3
TO PHONE C.B.A.

Fig. I-45

In playback, either the monaural or stereo audio signal is reproduced.

In monaural playback, only the 1.5 MHz component is output. Therefore, demodulated audio signal is output through the matrix circuit to provide same monaural sound at both the left and right sides.

In stereo playback, the L+R and L-R signals are extracted through the 1.5 MHz BPF and 1.7 MHz BPF, respectively. Then, each of these signals to the relevant demodulation circuit. Through the matrix separation circuit, the demodulated audio signal is supplied to each output terminal as an independent audio signal (to each of left and right channels).

CONTENTS

CHAPTER II. DISASSEMBLING/ADJUSTMENTS

1. Before Disassembling/Adjusting

1-1 List of maintenance tools and supplies II-1
1-2 Preparation for camera adjustment II-2
1-2-1 Basic setting II-2
1-2-2 How to open circuit board II-2
1-2-3 AWB adjustment mode II-3
1-2-4 Explanation of chart used II-4
1-2-5 Other precautions II-5
1-3 Preparatory procedures for recorder section adjustment II-6
1-3-1 Basic setting II-6
1-3-2 How to open circuit board II-6
1-3-3 Layout of each set II-7
1-3-4 Service modes II-8

2. Disassembling

2-1 Disassembling the covers II-10
2-1-1 Removal of finder ass'y and cassette cover II-10
2-1-2 Removal of top cover section II-10
2-1-3 Removal of left cover II-10
2-1-4 Separation of camera and recorder sections II-11
2-1-5 Removal of right cover II-11
2-1-6 Removal of rear cover II-11
2-1-7 Separation of top cover and EVF sections II-11
2-2 Disassembling the lens section II-12
2-2-1 Removal of AF motor and PZ motor II-12
2-2-2 Removal of relay lens assembly II-12
2-2-3 Removal of IG meter II-12
2-2-4 Removal of zoom ring assembly II-12
2-3 Disassembling of camera section II-13
2-3-1 Removal of PROCESS C.B.A. II-13
2-3-2 Removal of shield cases II-13
2-3-3 Removal of camera holder II-13
2-3-4 Removal of actuator assembly II-13
2-4 Disassembling of the recorder section II-14
2-4-1 Removal of R-KEY 1/2 C.B.A.s II-14
2-4-2 Removal of AUDIO/TERMINAL C.B.A.s II-14
2-4-3 Removal of VIDEO C.B.A. II-14
2-4-4 Removal of SYSCON SERVO C.B.A. and recorder holder II-14
2-5 Notice on assembling II-15

3. Adjusting the Lens Section

3-1 Optical system II-16
3-1-1 Back focus adjustment II-16
3-1-2 Preparation for afocal adjustment II-16
3-1-3 Afocal adjustment II-17
3-2 Auto focus adjustments II-18
3-2-1 Microcomputer clock adjustment II-18
3-2-2 Bimorph (piezo) amplitude adjustment II-18
3-2-3 Iris encoder adjustment II-18
3-2-4 VH·f time adjustment II-18

4. Electrical Adjustments of Camera Section

4-1 Clock frequency adjustment ... Ⅱ-19
4-2 PLL adjustment ... Ⅱ-19
4-3 Iris encoder adjustment ... Ⅱ-19
4-4 Auto iris adjustment ... Ⅱ-19
4-5 Y2H level adjustment ... Ⅱ-19
4-6 Setup adjustment ... Ⅱ-19
4-7 V aperture adjustment ... Ⅱ-20
4-8 Y level adjustment ... Ⅱ-20
4-9 White clip adjustment ... Ⅱ-20
4-10 Blooming adjustment ... Ⅱ-20
4-11 Color difference Gain/Modulation axis adjustments ... Ⅱ-21
4-12 Carrier balance adjustment ... Ⅱ-22
4-13 Chroma suppress adjustment ... Ⅱ-22
4-14 Color balance adjustment ... Ⅱ-23
4-15 FAWB adjustment ... Ⅱ-23
4-15-1 FAWB adjustment mode (1) ... Ⅱ-24
4-15-2 FAWB adjustment mode (2) ... Ⅱ-27

5. Electrical Adjustment of Recorder Section

5-1 SS5V adjustment ... Ⅱ-31
5-2 Undercut adjustment ... Ⅱ-31
5-3 ATF bias adjustment ... Ⅱ-31
5-4 Switching point adjustment ... Ⅱ-31
5-5 VIDEO 5V adjustment ... Ⅱ-31
5-6 Video AGC adjustment ... Ⅱ-31
5-7 YC separation adjustment ... Ⅱ-32
5-8 Video drop-out adjustment ... Ⅱ-32
5-9 W/D clip adjustment ... Ⅱ-32
5-10 Y FM carrier adjustment ... Ⅱ-32
5-11 Y FM deviation adjustment ... Ⅱ-32
5-12 Sub-carrier frequency adjustment ... Ⅱ-32
5-13 VCO free-run frequency adjustment ... Ⅱ-33
5-14 BM carrier offset adjustment ... Ⅱ-33
5-15 Chrominance emphasis adjustment ... Ⅱ-33
5-16 Recording current adjustment ... Ⅱ-33
5-17 Playback Y level adjustment ... Ⅱ-34
5-18 Character position of character generator adjustment ... Ⅱ-34

6. EVF Adjustment

6-1 Free-run frequency adjustment ... Ⅱ-36
6-2 Vertical amplitude adjustment ... Ⅱ-36
6-3 Rotation and centering adjustment ... Ⅱ-36
6-4 Brightness adjustment ... Ⅱ-36
6-5 Focus adjustment ... Ⅱ-36

7. Mechanical Adjustment of Recorder Section ... Ⅱ-37

1. Before Disassembling/Adjusting

1-1 List of maintenance tools and supplies

Maintenance tools

DESCRIPTION	TOOL NO.	REMARKS
Alignment tape E (MONOSCO)	DY9-1062-000	
Alignment tape G (V DO Master)	DY9-1064-000	
Rec. current checker	DY9-1056-000	
Y/C mix amplifier	DY9-1079-000	
Extension connector kit	DY9-1092-500	New
Y/C separator	DY9-1093-500	New
Color bar chart	DY9-2002-000	
Registration chart	DY9-2004-000	
Logarithmic gray scale chart	DY9-2005-000	
Adjuster (0.9 mm)	DY9-2020-000	
Phillips screwdriver (bit part only)	DY9-2030-000	
Adjuster (1.8 mm)	DY9-2041-000	
Color viewer (5600°K)	DY9-2039-500-220	EUROPE, H.K. etc.
	DY9-2039-500-240	U.K.
Color viewer lamp (5600°K)	DY9-2040-000	
CCB12 filter (100 x 100 mm)	DY9-2042-000	New
CCB8 filter (100 x 100 mm)	DY9-2043-000	New
ND-2.0 filter (100 x 100 mm)	DY9-2044-000	New

Supplies

DESCRIPTION	TOOL NO.	REMARKS
Screw lock 1401B	CY9-8012-000	
Grease LT-SH	CY9-8033-000	

Note: For recorder mechanism, refer to the mechanism manual MC-4B (DY8-3381-501 201) separately issued.

1-2 Preparation for camera adjustment

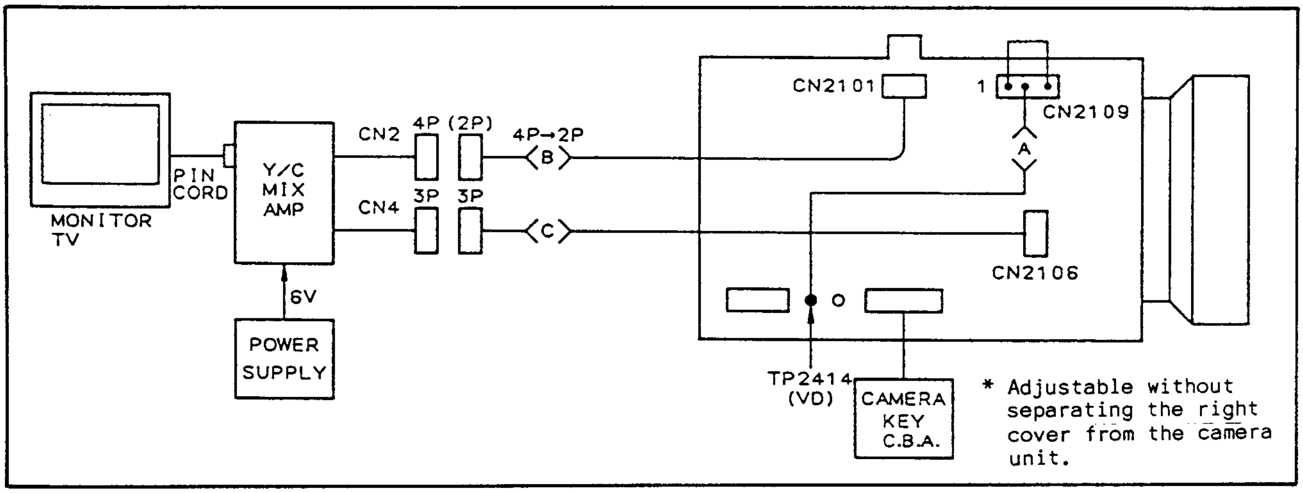
1-2-1 Basic setting

(1) Items to be prepared
- ° Y/C mix amplifier (DY9-1079-000)
- ° Extension connector kit (DY9-1092-500) marked A, B and C
- ° Constant voltage power supply (6 V)

(2) Remove the shield case and connect each cable.

Notes: 1. Solder the extension connector A between CN2109② and TP2414(VD).

2. The camera unit is adjustable without detaching the right cover. This is for keeping the camera key stable.



MONITOR TV
PIN CORD
Y/C MIX AMP
6V
POWER SUPPLY
CN2
4P (2P)
4P→2P
B
CN4
3P
3P
C
CN2101
1
CN2109
A
CN2106
TP2414 (VD)
CAMERA KEY C.B.A.

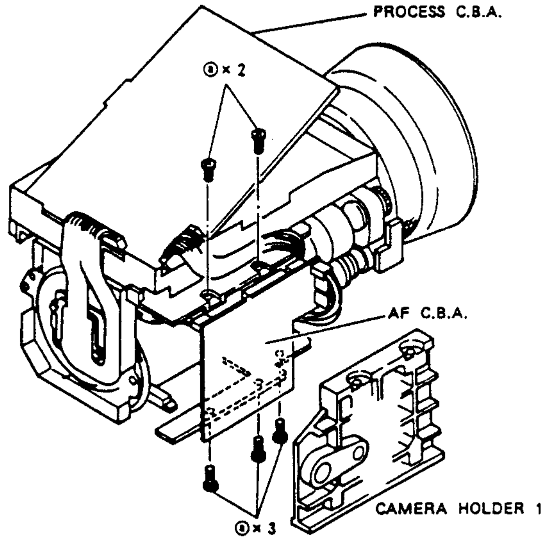
* Adjustable without separating the right cover from the camera unit.

Fig. II-1

1-2-2 How to open circuit board

(1) Remove solder and open the PROCESS circuit board.

(2) Remove five screws ⓐ and open the AF circuit board.



PROCESS C.B.A.
ⓐ× 2
AF C.B.A.
CAMERA HOLDER 1
ⓐ× 3

Fig. II-2

1-2-3 AWB adjustment mode

AWB adjustment of this instrument is automated by use of a microcomputer. It is effected with the camera input key. For character display, connect the camera, recorder and EVF.

(1) Transition to adjustment mode

① Mode (1): Automatic adjustment mode

Procedure : With TP2408 connected to GND, present display by remote control (referring to Fig. II-3 or Fig. II-4).

Description: At the specified color temperature, a bright dot is automatically adjusted to the center of vectorscope. This mode is employed usually.

② Mode (2): Manual adjustment mode

Procedure : ① Disconnect R2477 (0 Ω) from the PROCESS CBA.

② Connect Pin 48 of IC2403 to CAMERA 5V, and TP2408 to GND. Then, present the display by a remote control.

Description: At the specified color temperature, bright dot is manually adjusted to the center of vectorscope. This mode is not employed usually.

Notes:
1. Make setting as per either Fig. II-3 or Fig. II-4.
2. When peeling the seal from the battery mounting section, FAWB adjustment in 4-16 and color balance adjustment in 4-15 can be performed without disassembling the cover. (See Fig. II-3.)
3. Fig. II-4 shows independent power supply to each of the camera and recorder with the left cover detached.

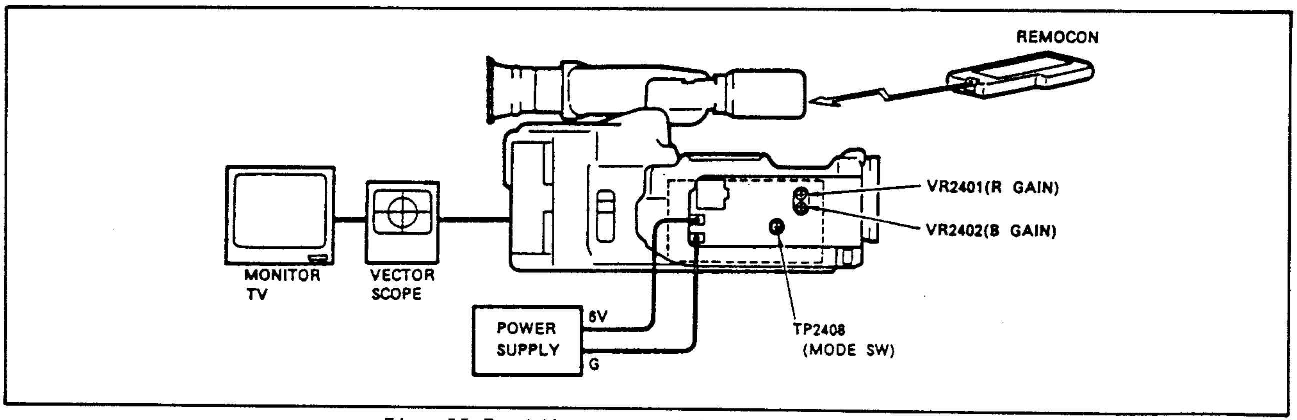

REMOCON
VR2401(R GAIN)
VR2402(B GAIN)
MONITOR TV
VECTOR SCOPE
POWER SUPPLY
6V
G
TP2408 (MODE SW)

Fig. II-3 Adjustment with cover attached

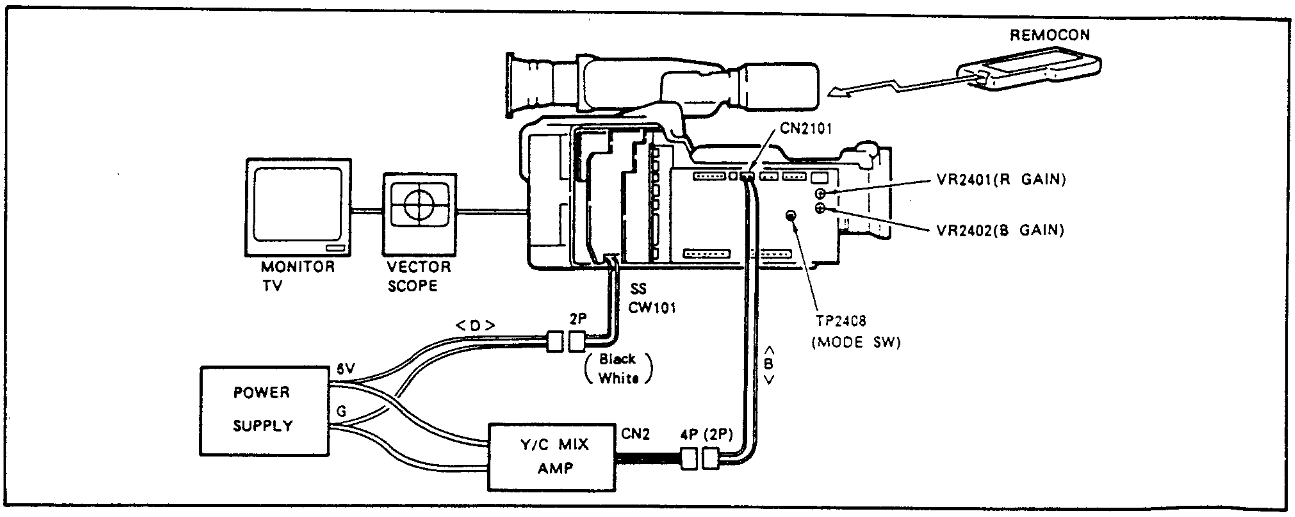
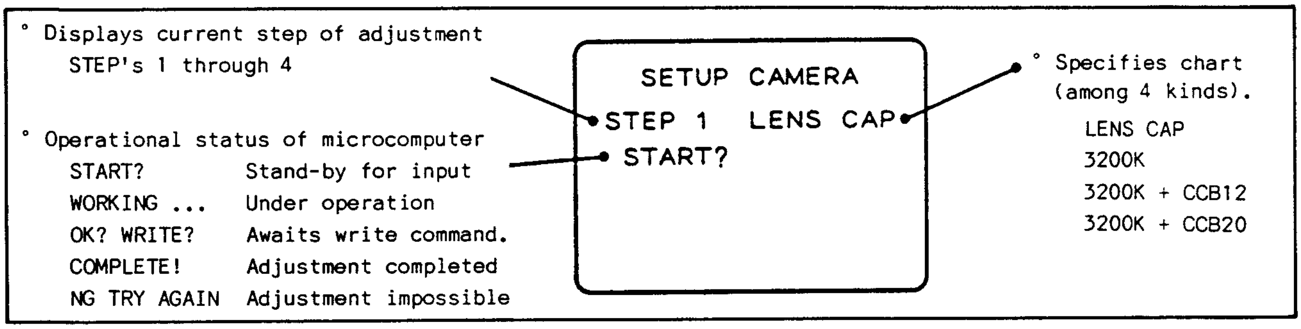

REMOCON
CN2101
VR2401(R GAIN)
VR2402(B GAIN)
MONITOR TV
VECTOR SCOPE
SS CW101
<D>
2P
TP2408 (MODE SW)
<B>
Black White
6V
POWER SUPPLY
G
Y/C MIX AMP
CN2
4P (2P)

Fig. II-4 Adjustment with left cover detached

(2) Adjustment character display

The following display appears in adjustment mode. Adjustment requires 4 steps.


SETUP CAMERA
STEP 1 LENS CAP
START?

° Displays current step of adjustment
STEP's 1 through 4

° Operational status of microcomputer

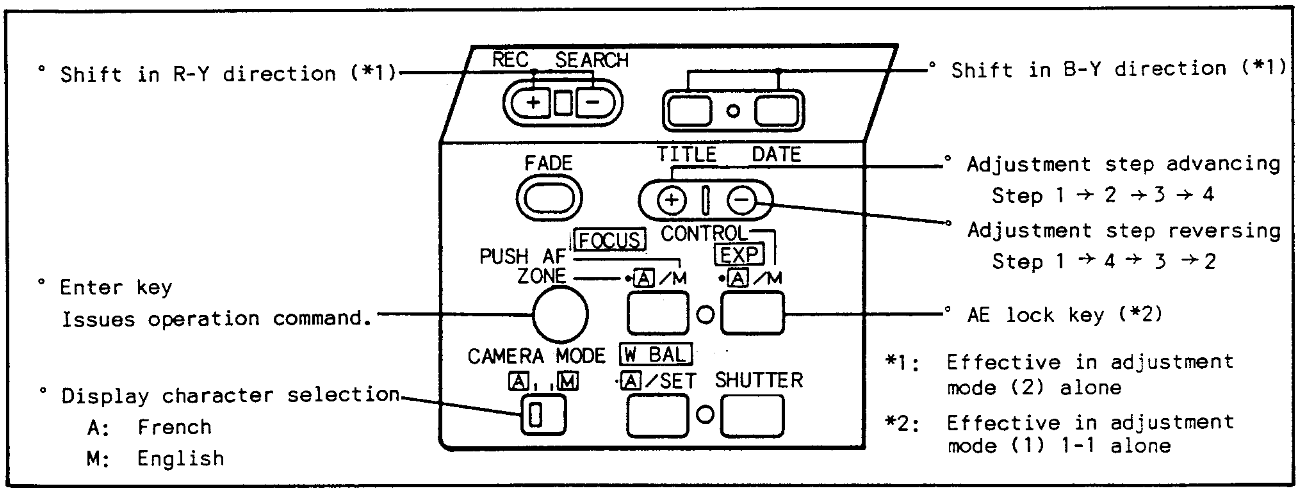
START?	Stand-by for input
WORKING ...	Under operation
OK? WRITE?	Awaits write command.
COMPLETE!	Adjustment completed
NG TRY AGAIN	Adjustment impossible

° Specifies chart (among 4 kinds).
- LENS CAP
- 3200K
- 3200K + CCB12
- 3200K + CCB20

Fig. II-5

(3) Function of camera keys

In the adjustment mode, each camera key functions as shown below.


REC SEARCH
FADE
TITLE DATE
PUSH AF
FOCUS
CONTROL
EXP
ZONE
A/M
A/M
CAMERA MODE
A, M
W BAL
A/SET
SHUTTER

° Shift in R-Y direction (*1)

° Shift in B-Y direction (*1)

° Adjustment step advancing
Step 1 → 2 → 3 → 4

° Adjustment step reversing
Step 1 → 4 → 3 → 2

° Enter key
Issues operation command.

° AE lock key (*2)

° Display character selection
A: French
M: English

*1: Effective in adjustment mode (2) alone

*2: Effective in adjustment mode (1) 1-1 alone

Fig. II-6

1-2-4 Explanation of chart used

(1) Fixture (accessory)

Used for FAWB adjustment in 4-16 and blooming adjustment in 4-10. Mount the fixture onto the front face of lens and attach various filters.

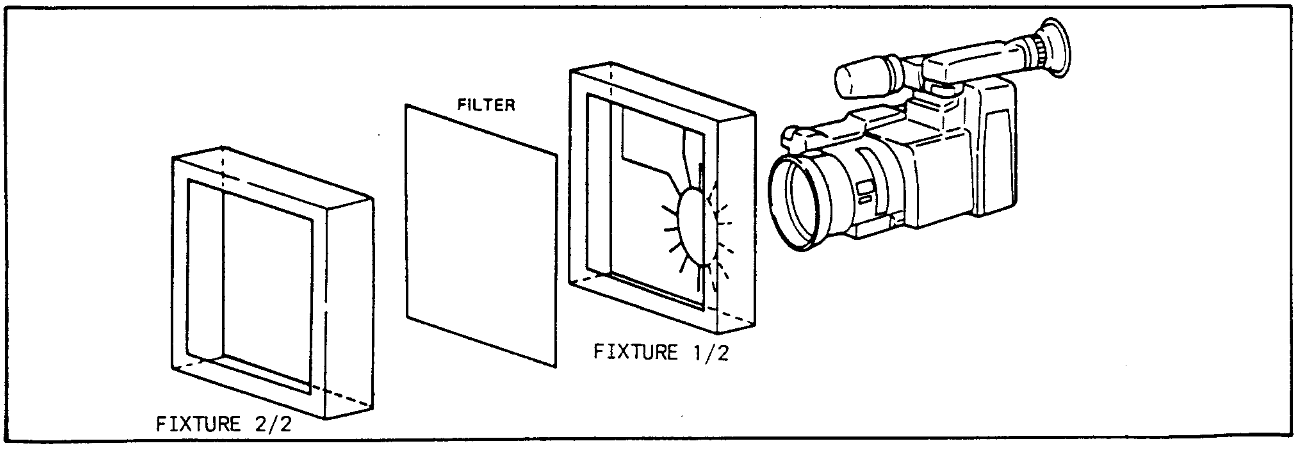

FILTER
FIXTURE 1/2
FIXTURE 2/2

Fig. II-7

(2) U-chart

1) Prepare by cutting a U pattern off the center of black paper. Size is detailed in Fig. II-8.
2) ⧗ marks indicate standard picture frame.

Note: White paper is attached on the black face for blooming adjustment in 4-10.

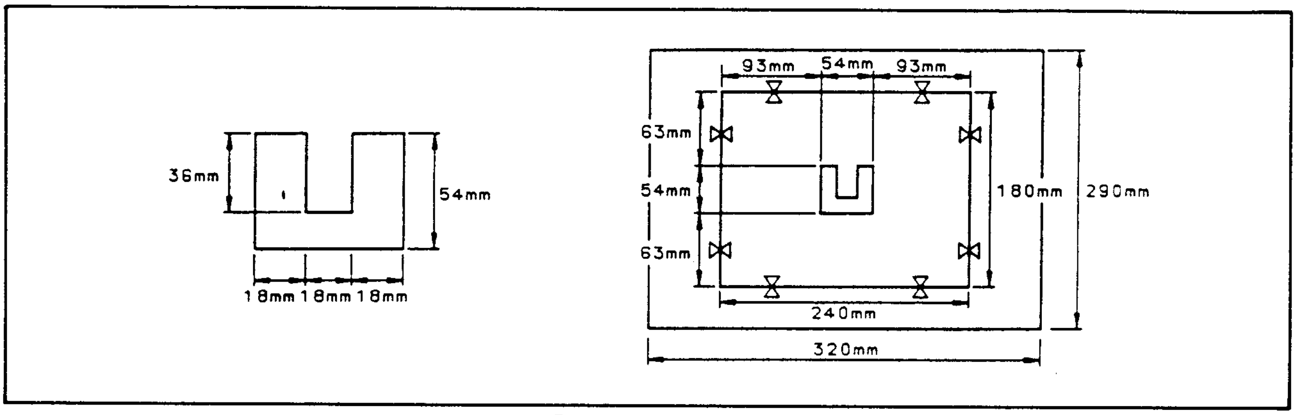

36mm
54mm
18mm 18mm 18mm
93mm
54mm
93mm
63mm
54mm
63mm
180mm
290mm
240mm
320mm

Fig. II-8

1-2-5 Other precautions

(1) Prior to adjustment, energize the instrument for 3 minutes or longer.

(2) Set the light box at color temperature 5600°K.

(3) Standard angle of view
- ° The standard angle of view is given when the chart is displayed so as to meet the maximum screen of the full scan monitor.
- ° With an oscilloscope, adjust the gray scale and color bar sections to 36 and 52 μs, respectively.
- ° In case of other chart, match the center at the standard angle of view, which has been set with the gray scale and color bar, followed by shooting.
- ° Shoot the white chart at its center.
- ° Unless otherwise specified, shooting distance must be about 1.4 m as a rule.

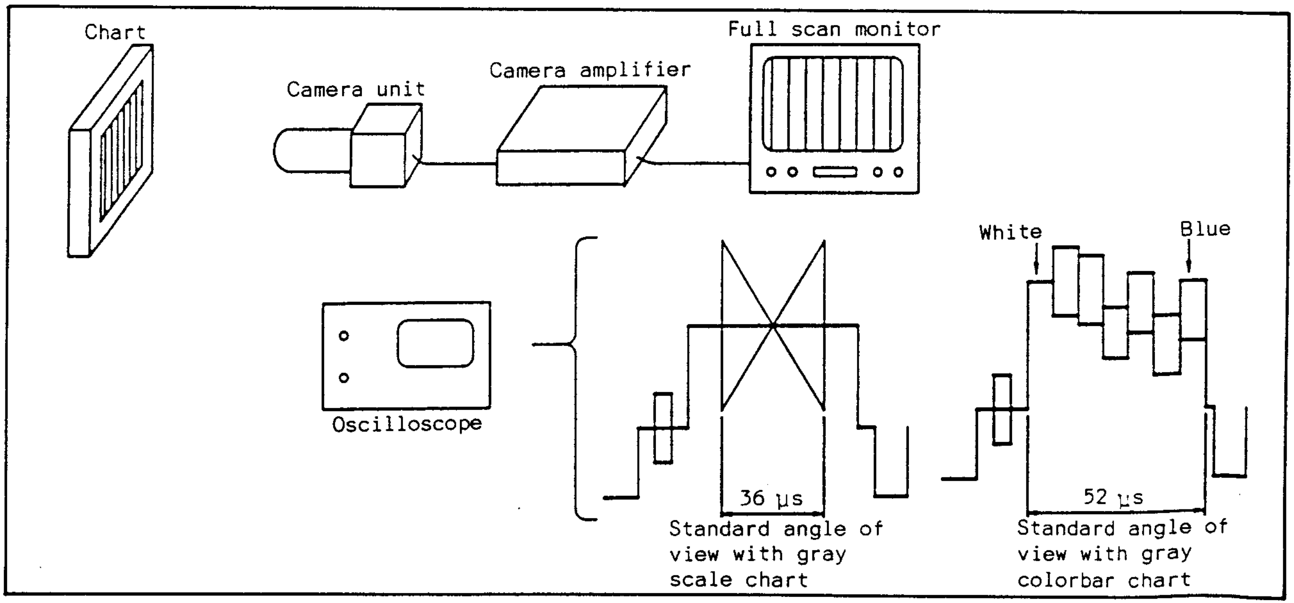


Chart
Camera unit
Camera amplifier
Full scan monitor
Oscilloscope
White
Blue
36 μs
Standard angle of view with gray scale chart
52 μs
Standard angle of view with gray colorbar chart

Fig. II-9

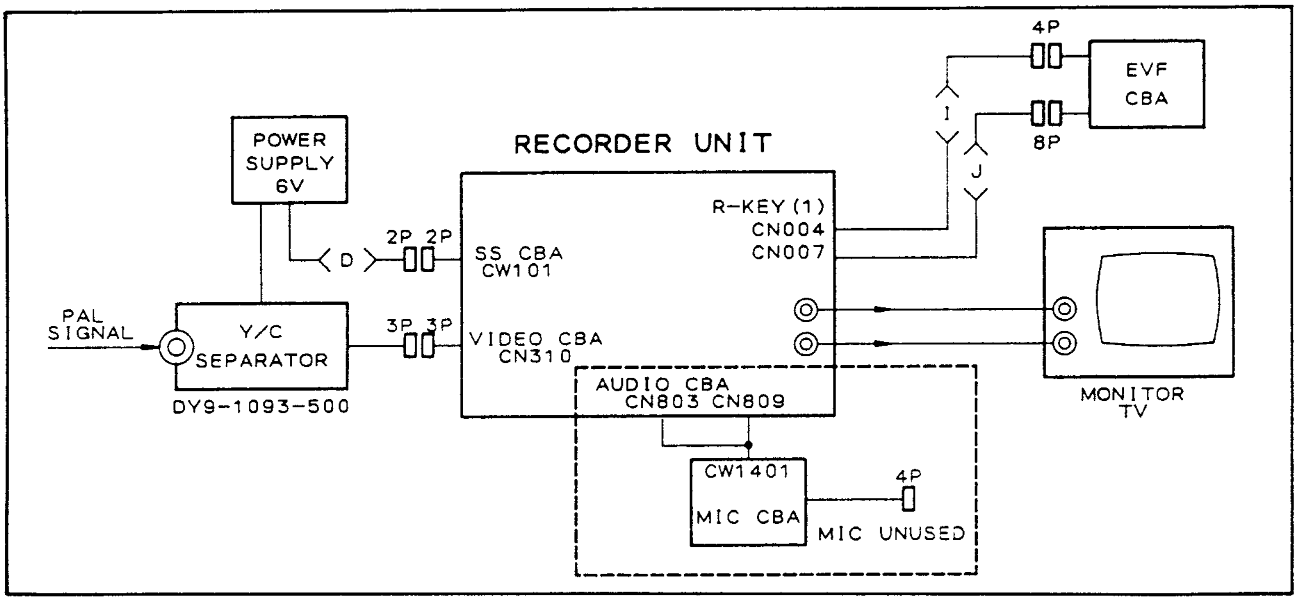
1-3 Preparatory procedures for recorder section adjustment

1-3-1 Basic setting

(1) Items to be prepared
- ° Y/C separator (DY9-1093-500)
- ° Extension connector kit (DY9-1092-500) marked D, I and J
- ° Constant voltage power supply (6 V)

(2) Make connection as shown in Fig. II-10.

Notes:
1. EVF may not be connected when characters need not be displayed on the monitor.
2. Connect the MIC CBA for checking the audio system.
3. For turning on/off power supply, short-circuit CN003 pins ⑤ and ⑥ of R-KEY(1) CBA. (See the left bottom side in the Fig. II-14.)
4. Turn to the line output mode with the CAM/L switch (SW1006) on the R-KEY(2) CBA.



RECORDER UNIT
POWER SUPPLY 6V
D
2P 2P
SS CBA CW101
PAL SIGNAL
Y/C SEPARATOR
DY9-1093-500
3P 3P
VIDEO CBA CN310
AUDIO CBA CN803 CN809
CW1401
MIC CBA
4P
MIC UNUSED
R-KEY (1) CN004 CN007
4P
8P
EVF CBA
I
J
MONITOR TV

Fig. II-10

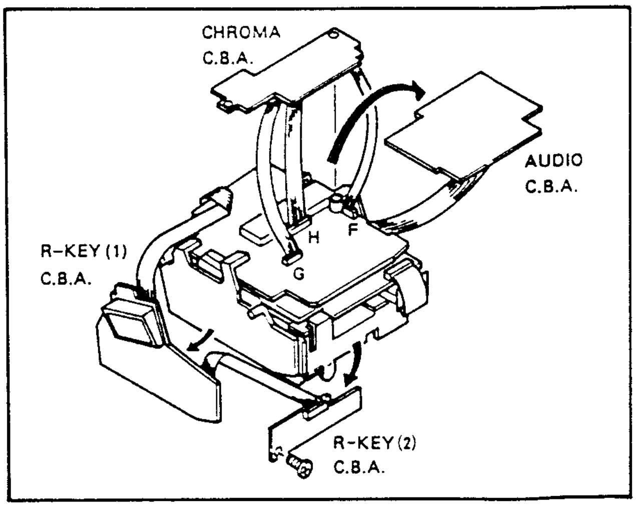
1-3-2 How to open circuit board

(1) Remove a screw and separate the R-KEY(2) CBA.

(2) Detach the AUDIO CBA and R-KEY(1) CBA from the recorder holder, and open the circuit board.

(3) Remove two screws which fasten the CHROMA CBA and connect extension connectors (F, G and H) to it.

* In this status, each part mounting face of R-KEY(1) and VIDEO CBA's can be checked.



CHROMA C.B.A.
AUDIO C.B.A.
H
F
G
R-KEY (1) C.B.A.
R-KEY (2) C.B.A.

Fig. II-11

(4) Separate two recorder holders by removing four screws.

(5) Remove three screws which fasten the VIDEO CBA to open the circuit board.

(6) Detach the AUDIO CBA.

(7) Remove a single screw which fastens the TERMINAL CBA, and open the circuit board.

* Now almost all checks of the electrical system have become possible. (See Fig. II-12.)

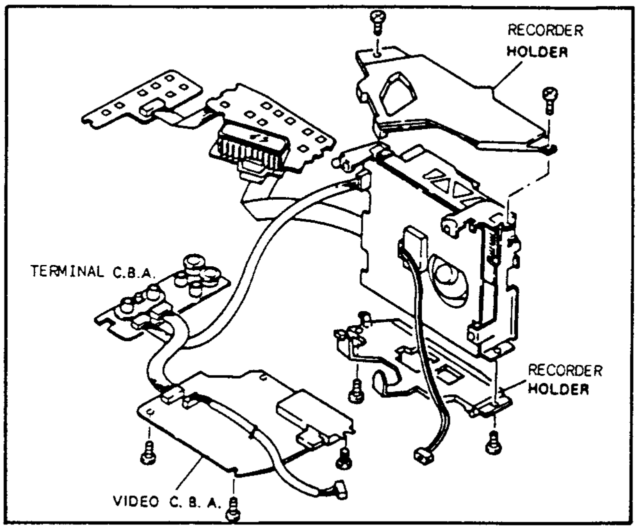

RECORDER HOLDER
TERMINAL C.B.A.
RECORDER HOLDER
VIDEO C. B. A.

Fig. II-12

(8) Remove two screws which secure the SS CBA.

(9) Of the extension connectors, use the ones shown below for opening the circuit board.

K: T reel extension cable (11P)
L: S reel extension cable (13P) } 1 each
M: Drum extension cable (13P)
N: L/M connector 2
O: K connector 1

* Under the present condition, all checks of the electrical and mechanical systems are possible. (Fig. II-13.)

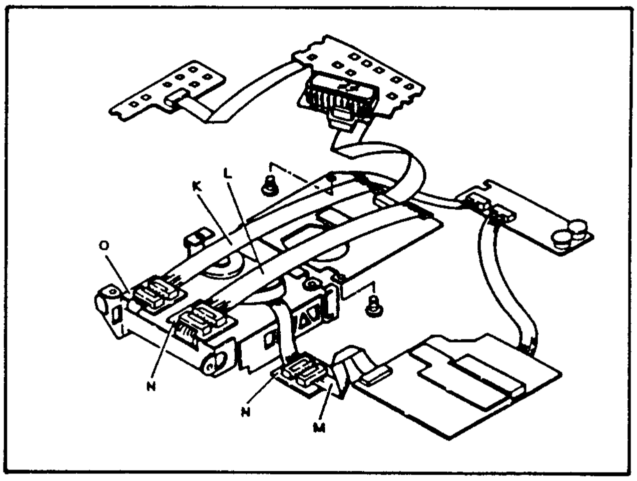


Fig. II-13

1-3-3 Layout of each set

Notes: 1. For transport adjustment, connect the extension connector E to the AUDIO CBA CN806.
2. To turn on/off power supply, short-circuit CN003 pins ⑤ and ⑥ of the R-KEY(1) CBA.

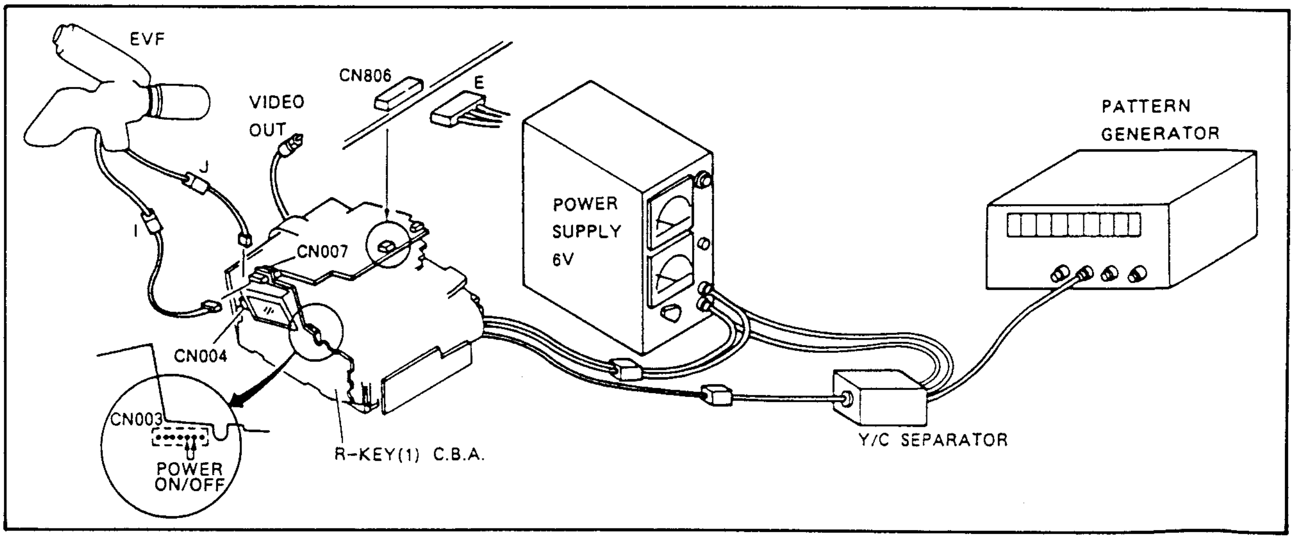

EVF
CN806
E
VIDEO OUT
J
I
CN007
CN004
CN003
POWER ON/OFF
R-KEY(1) C.B.A.
POWER SUPPLY 6V
PATTERN GENERATOR
Y/C SEPARATOR

Fig. II-14

1-3-4 Service modes

Service modes are provided for adjustments/operation checks. Active these modes with the recorder and EVF connected for the purpose of character display.
In the service modes, the error detections listed below are canceled.

- ° Drum rotation error
- ° Capstan rotation error
- ° Reel rotation error

(1) Transition to service modes

Transition from the normal operation mode to service mode is possible in two ways below.

<Method 1>
Mode is switched over in the following sequence whenever connecting the TP004 (TEST M) of R-KEY(1) circuit board to TP001 (SS GND).

NORMAL → 1 → 2 → 3 → 4 → 5 → 6 → 7 → NORMAL

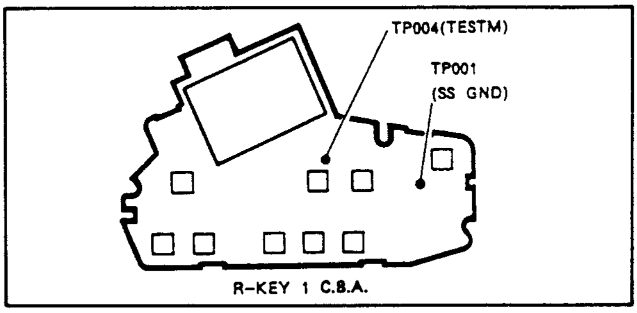


Fig. II-15

<Method 2>
Mode transition also occurs each time the pattern of remote control (WL-100) is short-circuited. This allows operation check without disassembling the main unit.
The remote control (WL-E80) is also usable in a similar way.
The WL-100 is set as a service part.

DY2-6018-000 (A1E)
DY2-6020-000 (A1F)

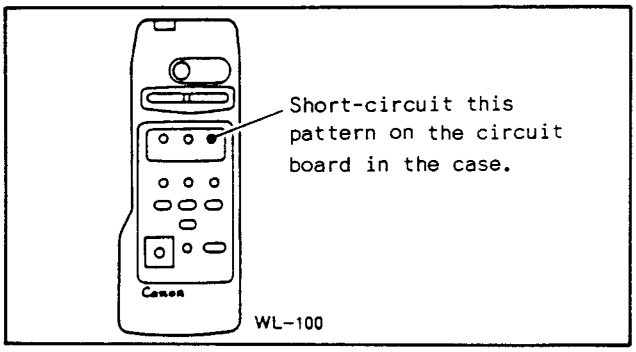
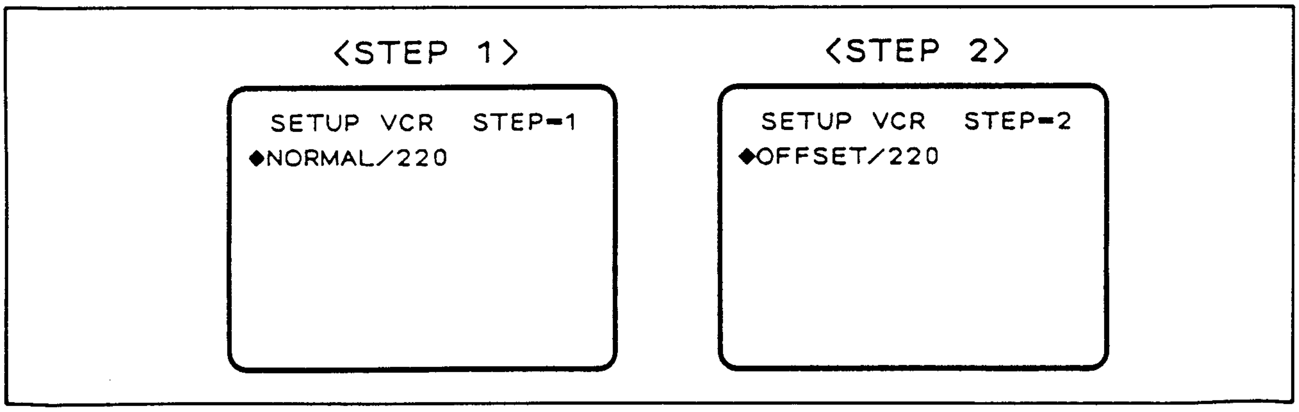

Short-circuit this pattern on the circuit board in the case.
Canon
WL-100

Fig. II-16

(2) Function of service mode

[Steps 1/2]
Mode for transport adjustment. (Refer to MC-4B manual for more details.)
RF envelope for 220° can be checked by altering the duty factor of head switching pulse.

- ° Step 1 effects normal tracking. .... 100% RF envelope output
- ° Step 2 effects tracking in offset status. ..... 70% RF envelope output (Note: P.II-38)



<STEP 1>

SETUP VCR STEP-1
◆NORMAL/220

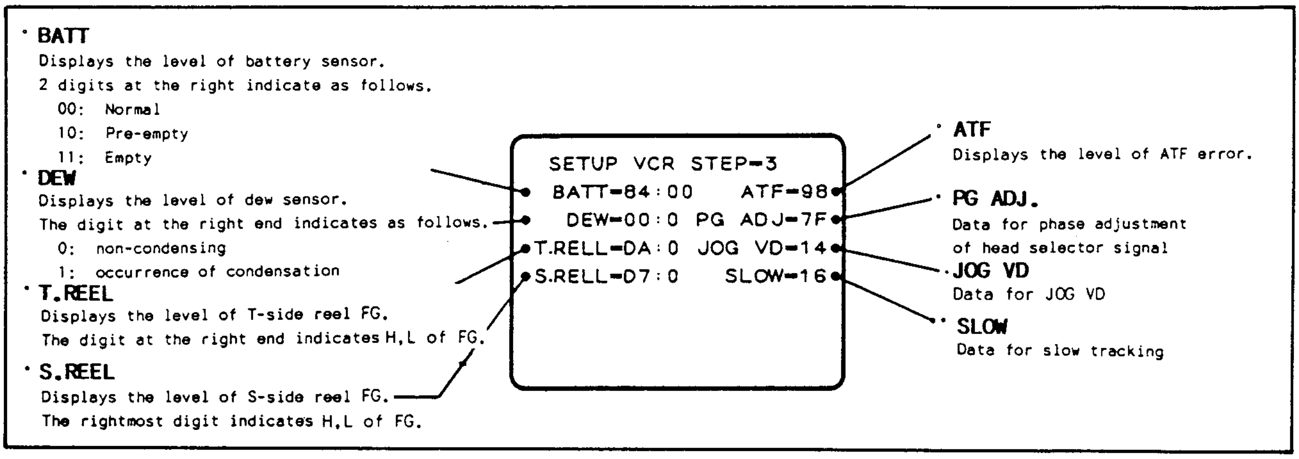
<STEP 2>

SETUP VCR STEP-2
◆OFFSET/220

Fig. II-17

[Step 3]

Data of the A/D converter (used for electrical adjustment).



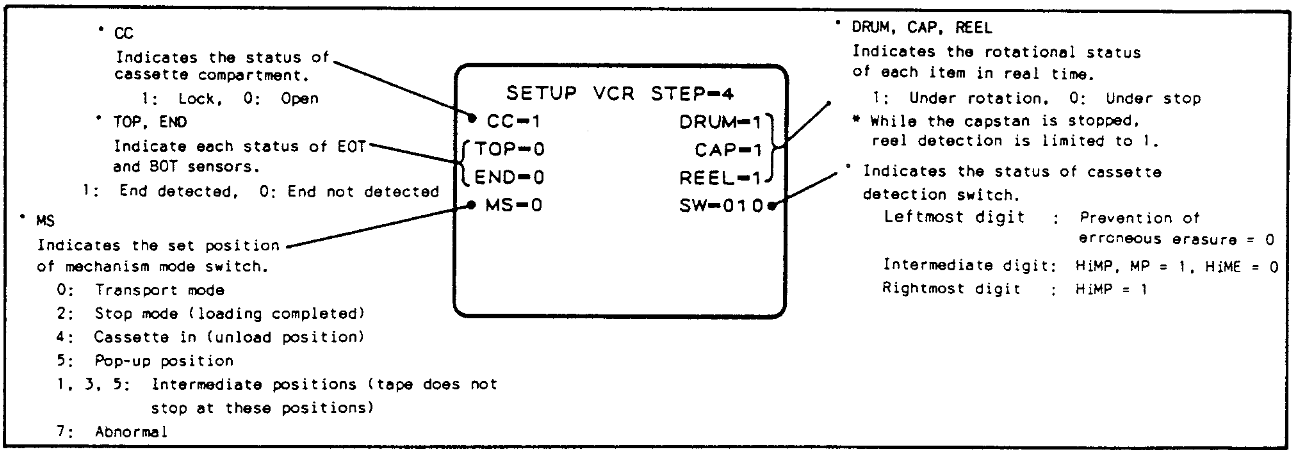
```
SETUP VCR STEP-3
 BATT-84:00     ATF-98
  DEW-00:0  PG ADJ-7F
T.RELL-DA:0  JOG VD-14
S.RELL-07:0    SLOW-16
```

- **BATT**
  Displays the level of battery sensor.
  2 digits at the right indicate as follows.
  00: Normal
  10: Pre-empty
  11: Empty
- **DEW**
  Displays the level of dew sensor.
  The digit at the right end indicates as follows.
  0: non-condensing
  1: occurrence of condensation
- **T.REEL**
  Displays the level of T-side reel FG.
  The digit at the right end indicates H,L of FG.
- **S.REEL**
  Displays the level of S-side reel FG.
  The rightmost digit indicates H,L of FG.
- **ATF**
  Displays the level of ATF error.
- **PG ADJ.**
  Data for phase adjustment of head selector signal
- **JOG VD**
  Data for JOG VD
- **SLOW**
  Data for slow tracking

Fig. II-18

[Step 4]

Mechanism data (used for operation check)



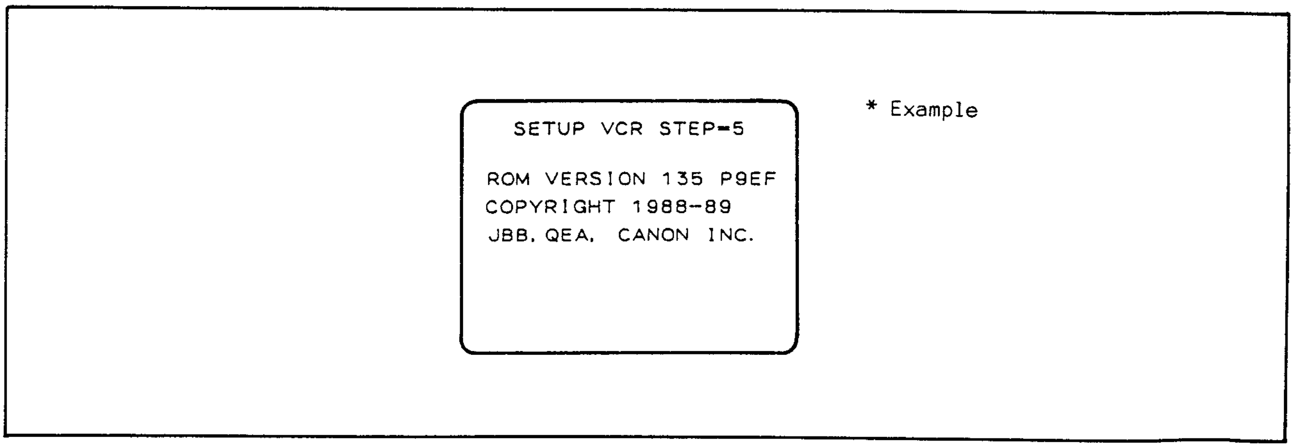
```
SETUP VCR STEP-4
 CC-1         DRUM-1
 TOP-0         CAP-1
 END-0        REEL-1
 MS-0         SW-010
```

- CC
  Indicates the status of cassette compartment.
  1: Lock, 0: Open
- TOP, END
  Indicate each status of EOT and BOT sensors.
  1: End detected, 0: End not detected
- MS
  Indicates the set position of mechanism mode switch.
  0: Transport mode
  2: Stop mode (loading completed)
  4: Cassette in (unload position)
  5: Pop-up position
  1, 3, 5: Intermediate positions (tape does not stop at these positions)
  7: Abnormal
- DRUM, CAP, REEL
  Indicates the rotational status of each item in real time.
  1: Under rotation, 0: Under stop
  * While the capstan is stopped, reel detection is limited to 1.
- Indicates the status of cassette detection switch.
  Leftmost digit : Prevention of erroneous erasure = 0
  Intermediate digit: HiMP, MP = 1, HiME = 0
  Rightmost digit : HiMP = 1

Fig. II-19

[Step 5]

Version of microcomputer (used for servo mechanism) Attention must be paid since adjustment value in "switching point" adjustment varies with the version.



```
SETUP VCR STEP-5

ROM VERSION 135 P9EF
COPYRIGHT 1988-89
JBB. QEA. CANON INC.
```

* Example

Fig. II-20

[Steps 6/7]

Internal data (unusable for adjustment, operation check, etc.)
In the step 7, all LCD's are lit.

2. Disassembling

2-1 Disassembling the covers

2-1-1 Removal of finder ass'y and cassette cover

(1) Remove the finder ass'y.
(2) Peel two cassette cover seals.
(3) Remove 2 screws ⓐ.
(4) Detach the cassette cover.

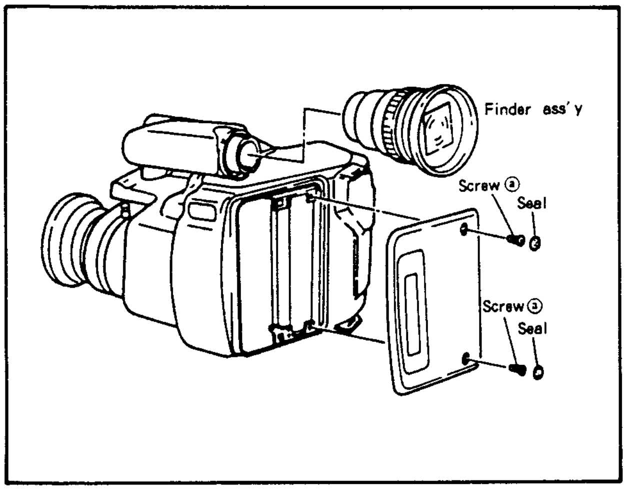

Finder ass'y
Screw ⓐ
Seal
Screw ⓐ
Seal

Fig. II-21

2-1-2 Removal of top cover section

(1) Remove ten screws ⓐ.
(2) Slightly lift the front of cover and remove it while turning clockwise.
(3) Unplug CN004, CN007 and CN1401.
(4) Detach the top cover section.

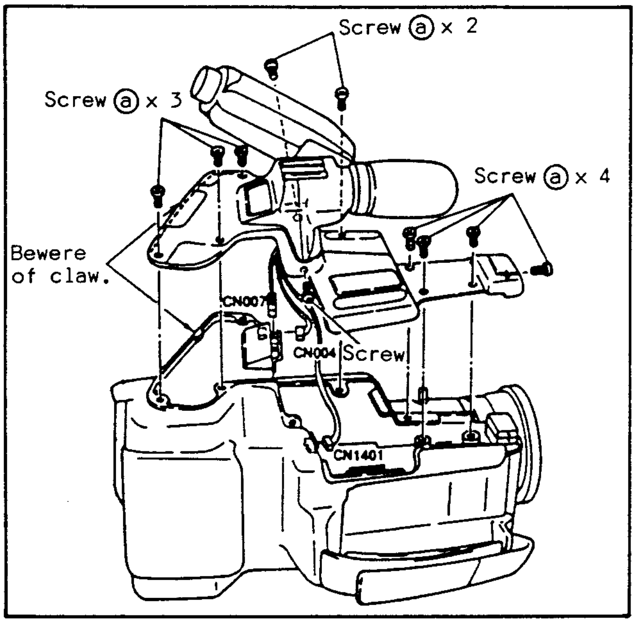

Screw ⓐ x 2
Screw ⓐ x 3
Screw ⓐ x 4
Bewere of claw.
CN007
CN004
Screw
CN1401

Fig. II-22

2-1-3 Removal of left cover

(1) Remove two screws ⓐ, and then the side grip.
(2) Dismount the white balance sensor section.
(3) Remove five screws ⓑ and pull out CN003, CN803, CN807, CN809, CN1103, CN2101 and CN2851. Then detach the left cover.

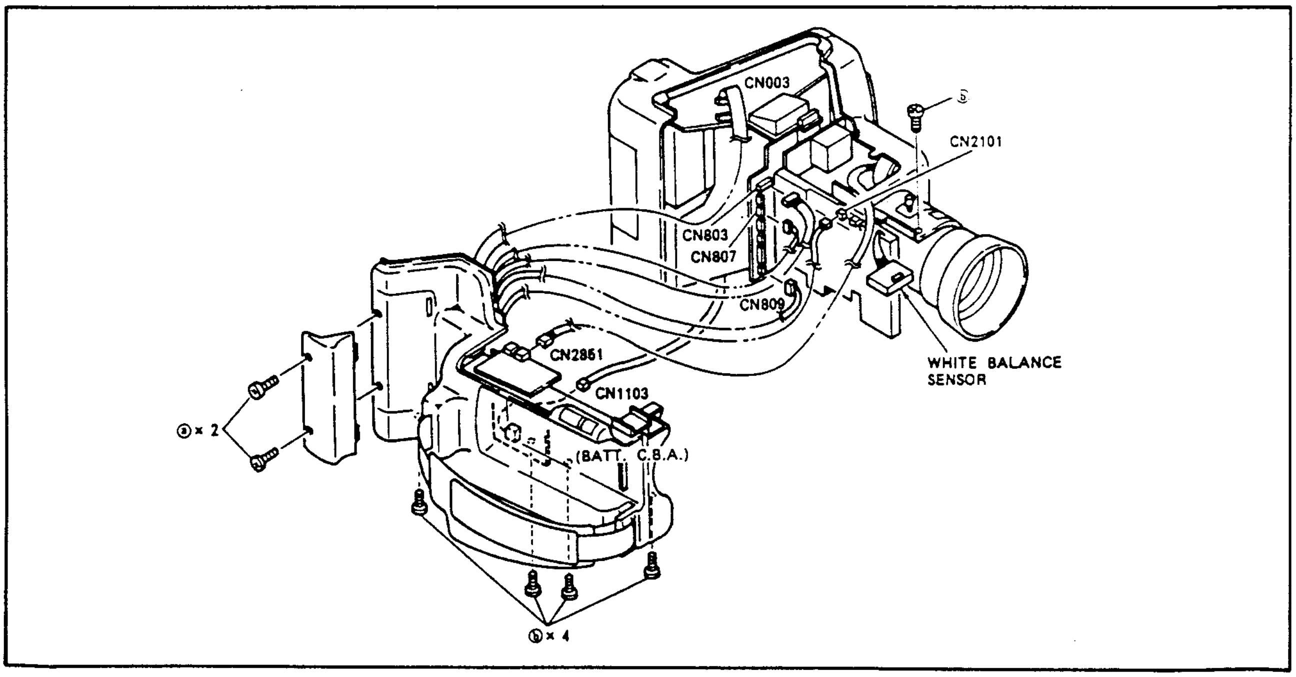

CN003
ⓑ
CN2101
CN803
CN807
CN809
CN2851
CN1103
WHITE BALANCE SENSOR
ⓐ× 2
(BATT. C.B.A.)
ⓑ× 4

Fig. II-23

2-1-4 Separation of camera and recorder sections

(1) Pull out CN2109 and CN2106.
(2) Open the jack lid and remove three screws ⓐ.
(3) Remove a screw ⓑ.
(4) Remove two screws ⓒ.
(5) Remove a screw ⓓ.
(6) Separate the camera and recorder sections. (There is a claw.)
(7) Pull out CN306 and CN805.

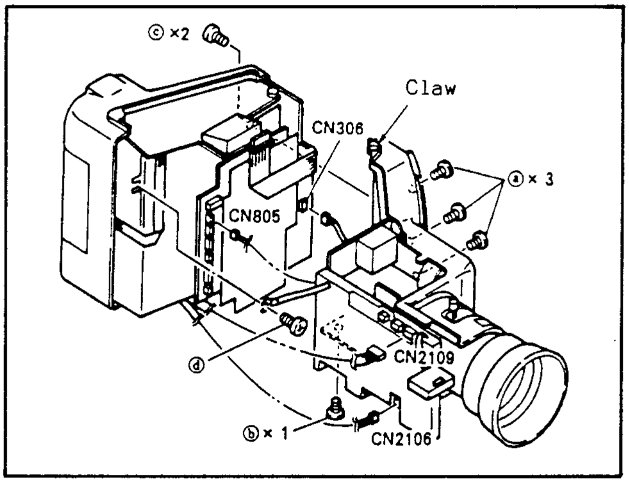


Fig. II-24

2-1-5 Removal of right cover

(1) Pull out CN2108.
(2) Turn the zoom lever toward the wide side.
(3) Remove three screws ⓐ.
(4) Detach the right cover.

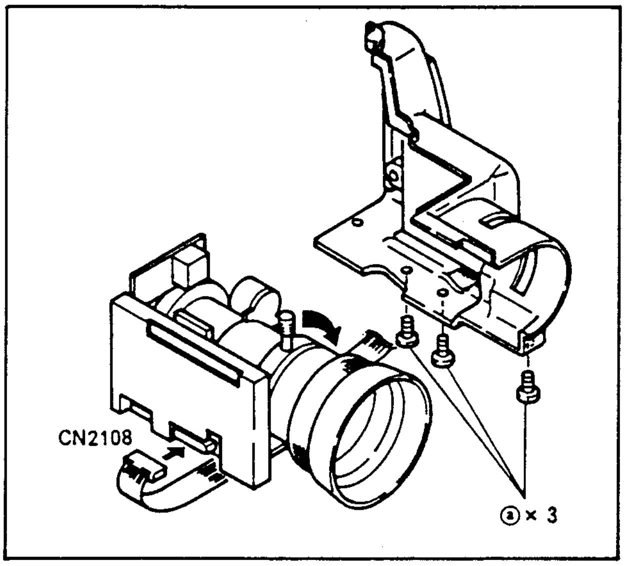


Fig. II-25

2-1-6 Removal of rear cover

(1) Pull out CN005.
(2) Remove the rear cover (claw provided at 3 locations).

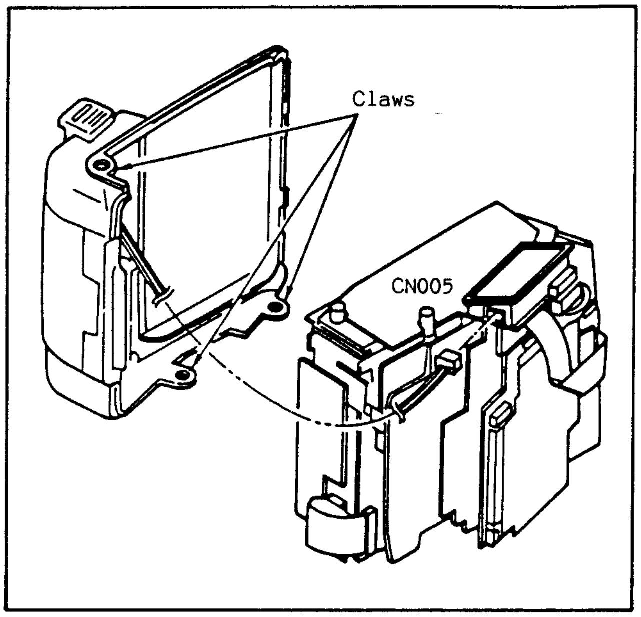


Fig. II-26

2-1-7 Separation of top cover and EVF sections

(1) Remove two screws ⓐ.
(2) Remove two screws ⓑ.
(3) Separate the top cover and EVF sections.

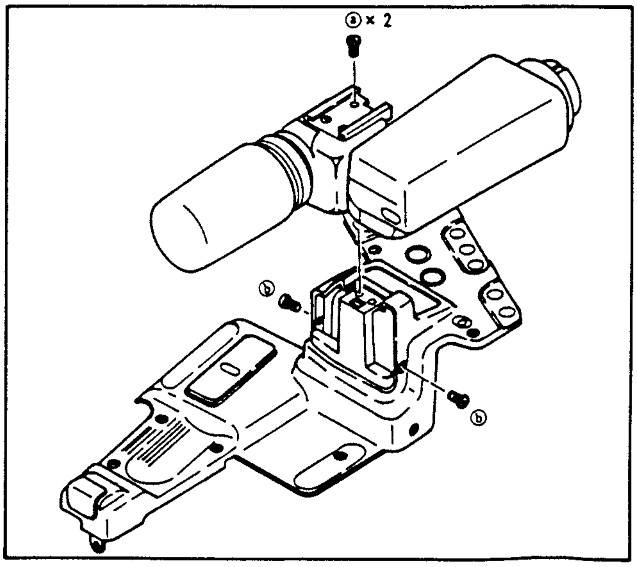


Fig. II-27

2-2 Disassembling the lens section

2-2-1 Removal of AF motor and PZ motor

(1) Remove four screws ⓐ.
(2) Dismount the AF and PZ motors.
(3) Remove a screw ⓑ and unplug the PR C.B.A..
(4) Remove a screw ⓒ and detach the PR C.B.A. holder.

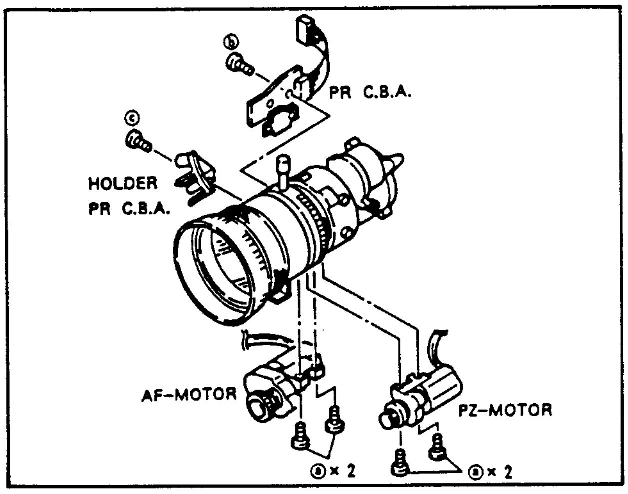


Fig. II-28

2-2-2 Removal of relay lens assembly

(1) Remove a screw ⓐ and dismount the relay adjustment part.
(2) Detach the relay lens assembly.

Note: After remounting, back focus must be adjusted.

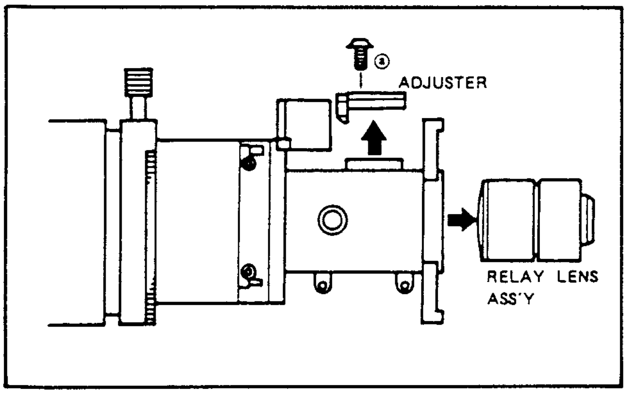


Fig. II-29

2-2-3 Removal of IG meter

(1) Remove three screws ⓐ.
(2) Dismount the IG meter.

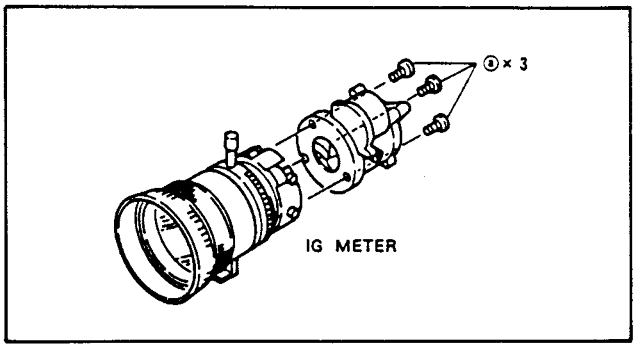
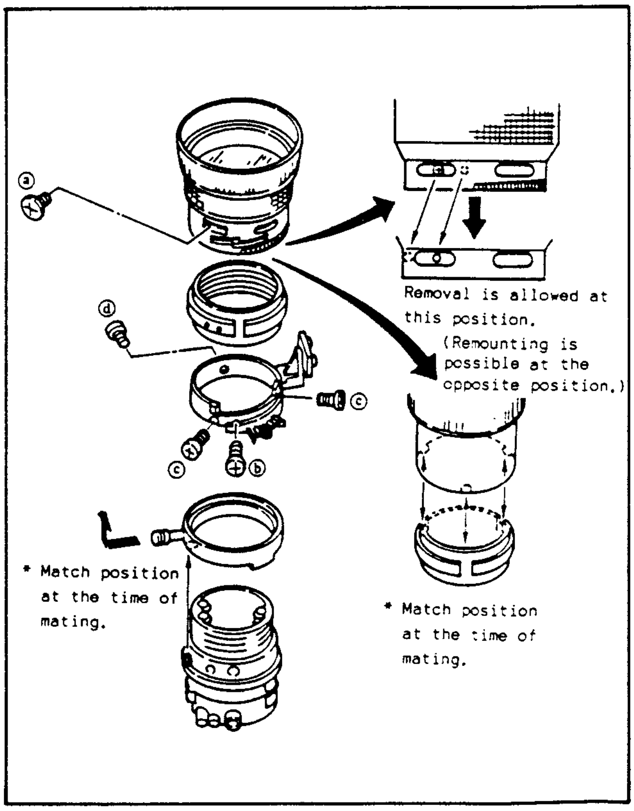


Fig. II-30

2-2-4 Removal of zoom ring assembly

(1) Remove a screw ⓐ.
(2) Turn only the concave helicoid inside the focus lens assembly clockwise (when viewed form the front). Dismount the focus lens assembly.
(3) Dismount the concave helicoid and index ring assembly.
(4) Remove a screw ⓑ, two screws ⓒ and a screw ⓓ.
(5) Detach the zoom ring assembly while pulling the macro knob.



Removal is allowed at this position.
(Remounting is possible at the opposite position.)

* Match position at the time of mating.

* Match position at the time of mating.

Fig. II-31

2-3 Disassembling of camera section

2-3-1 Removal of PROCESS C.B.A.

(1) Unsolder 5 locations ⓐ of the shield case.

(2) Detach the shield cases ⓐ and ⓑ.

(3) Pull out CN2104, CN2105, CN2107, CN2110 and CN2102.

(4) Unsolder 3 locations ⓑ between the shield case and RPOCESS C.B.A..

(5) Dismount the PROCESS C.B.A..

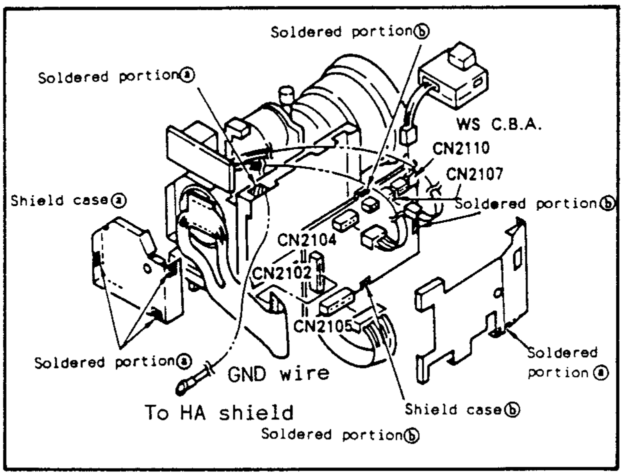

Soldered portionⓑ
Soldered portionⓐ
WS C.B.A.
CN2110
CN2107
Shield caseⓐ
Soldered portionⓑ
CN2104
CN2102
CN2105
Soldered portionⓐ
GND wire
Soldered portionⓐ
To HA shield
Shield caseⓑ
Soldered portionⓑ

Fig. II-32

2-3-2 Removal of shield cases

(1) Detach the insulating sheet.

(2) Remove three screws ⓐ.

(3) Dismount the shield case ⓐ.

(4) Pull out CN701 and CN702.

(5) Remove two screws ⓑ.

(6) Separate the PD C.B.A. and PD holder.

(7) Remove a screw ⓒ.

(8) Dismount the shield case ⓑ.

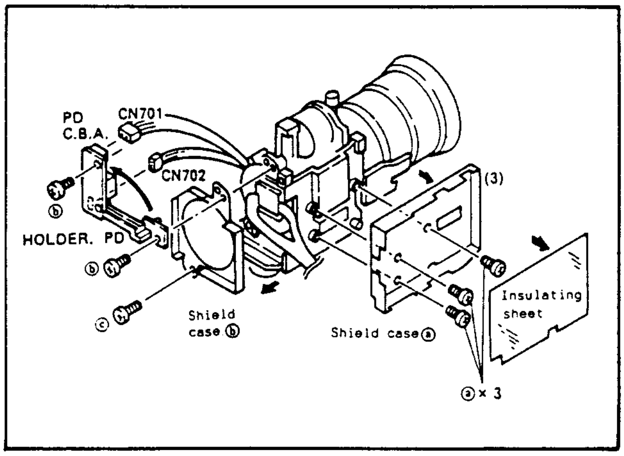

PD C.B.A.
CN701
CN702
ⓑ
HOLDER, PD
ⓑ
ⓒ
Shield case ⓑ
Shield caseⓐ
(3)
Insulating sheet
ⓐ× 3

Fig. II-33

2-3-3 Removal of camera holder

(1) Remove five screws ⓐ.

(2) Dismount the camera holder (3).

(3) Remove two screws ⓑ and two screws ⓒ.

(4) Dismount the camera holders (1) and (2).

(5) Detach the AF C.B.A..

(6) Pull out CN2602, CN2603, CN2604 and CN2608.

(7) Disconnect the DC/DC converter.

(8) Remove two screws ⓓ.

(9) Dismount the DC/DC converter holder.

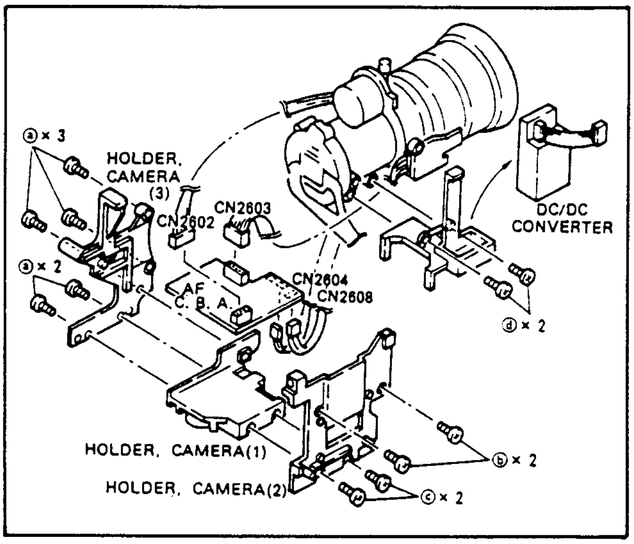

ⓐ× 3
HOLDER, CAMERA (3)
CN2602
CN2603
ⓐ× 2
AF C.B.A.
CN2604
CN2608
DC/DC CONVERTER
ⓓ× 2
HOLDER, CAMERA(1)
HOLDER, CAMERA(2)
ⓑ× 2
ⓒ× 2

Fig. II-34

2-3-4 Removal of actuator assembly

(1) Remove three screws ⓐ.

(2) Dismount the actuator assembly and actuator reinforcement plate.

(3) Remove two screws ⓑ.

(4) Eliminate solder from the foot of CCD and detach the flexible joint.

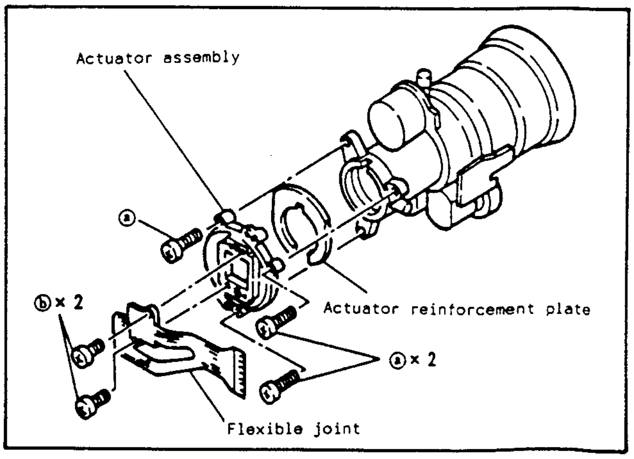

Actuator assembly
ⓐ
ⓑ× 2
Actuator reinforcement plate
ⓐ× 2
Flexible joint

Fig. II-35

2-4 Disassembling of the recorder section

2-4-1 Removal of R-KEY 1/2 C.B.A.s

(1) Remove a screw ⓐ and dismount the R-KEY 2 C.B.A..
(2) To remove a shield sheet, remove a screw ⓑ.
(3) Dismount the R-KEY 1 C.B.A..
(4) Pull out CN001 and 006.

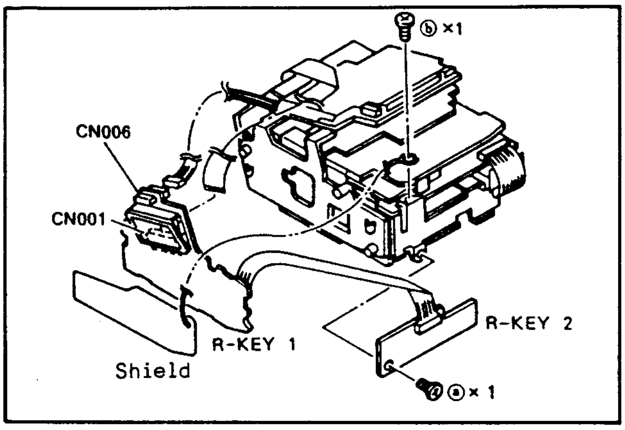

ⓑ×1
CN006
CN001
R-KEY 2
R-KEY 1
Shield
ⓐ×1

Fig. II-36

2-4-2 Removal of AUDIO/TERMINAL C.B.A.s

(1) Remove a screw ⓐ.
(2) Pull out CN801, 802 and 808.
(3) Dismount the AUDIO C.B.A..
(4) Remove a screw ⓑ.
(5) Pull out CN1201, 1202 and 1208.
(6) Dismount the recorder holder 3 and TERMINAL C.B.A.
(7) Remove four screws ⓒ.
(8) Dismount recorder holders 1 and 2.

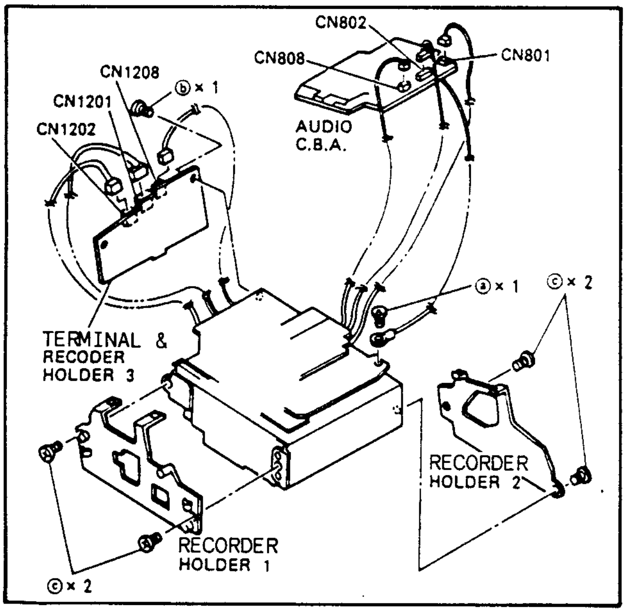

CN802
CN808
CN801
CN1208
ⓑ× 1
CN1201
CN1202
AUDIO C.B.A.
ⓐ× 1
ⓒ× 2
TERMINAL & RECODER HOLDER 3
RECORDER HOLDER 2
RECORDER HOLDER 1
ⓒ× 2

Fig. II-37

2-4-3 Removal of VIDEO C.B.A.

(1) Remove a screw ⓐ.
(2) Pull out CN301, 302 and 701.
(3) Detach the VIDEO C.B.A..

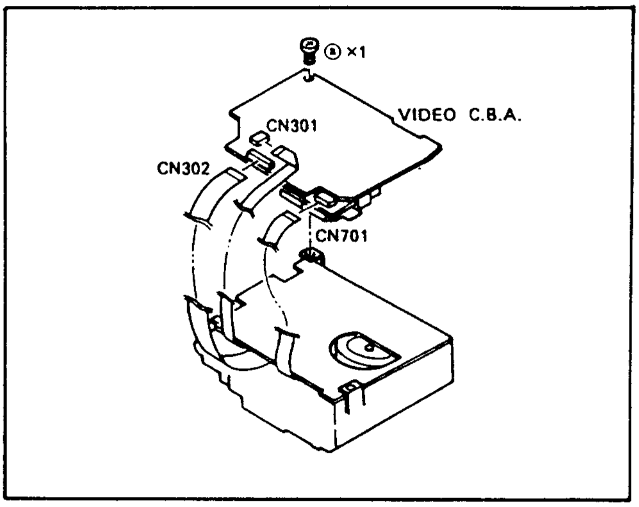

ⓐ×1
CN301
VIDEO C.B.A.
CN302
CN701

Fig. II-38

2-4-4 Removal of SYSCON SERVO C.B.A. and recorder holder

(1) Remove 2 screws ⓐ.
(2) Pull out CN102, 103, 106, 108, 201, 202 and 203.
(3) Dismount the SYSCON SERVO C.B.A..
(4) Remove two screws ⓑ.
(5) Dismount the recorder holder 4.

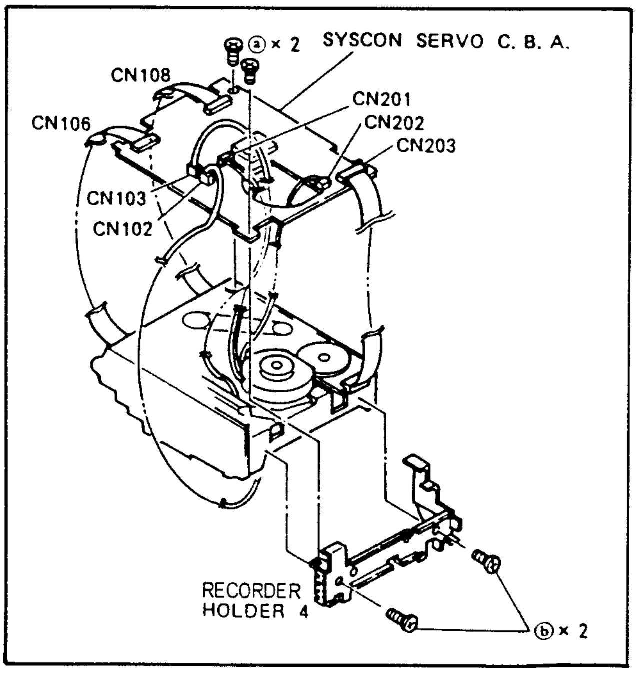

ⓐ× 2
SYSCON SERVO C. B. A.
CN108
CN106
CN201
CN202
CN203
CN103
CN102
RECORDER HOLDER 4
ⓑ× 2

Fig. II-39

2-5 Notice on assembling

(1) Prior to connection, confirm each wiring of SYSCON SERVO and VIDEO C.B.A.s.

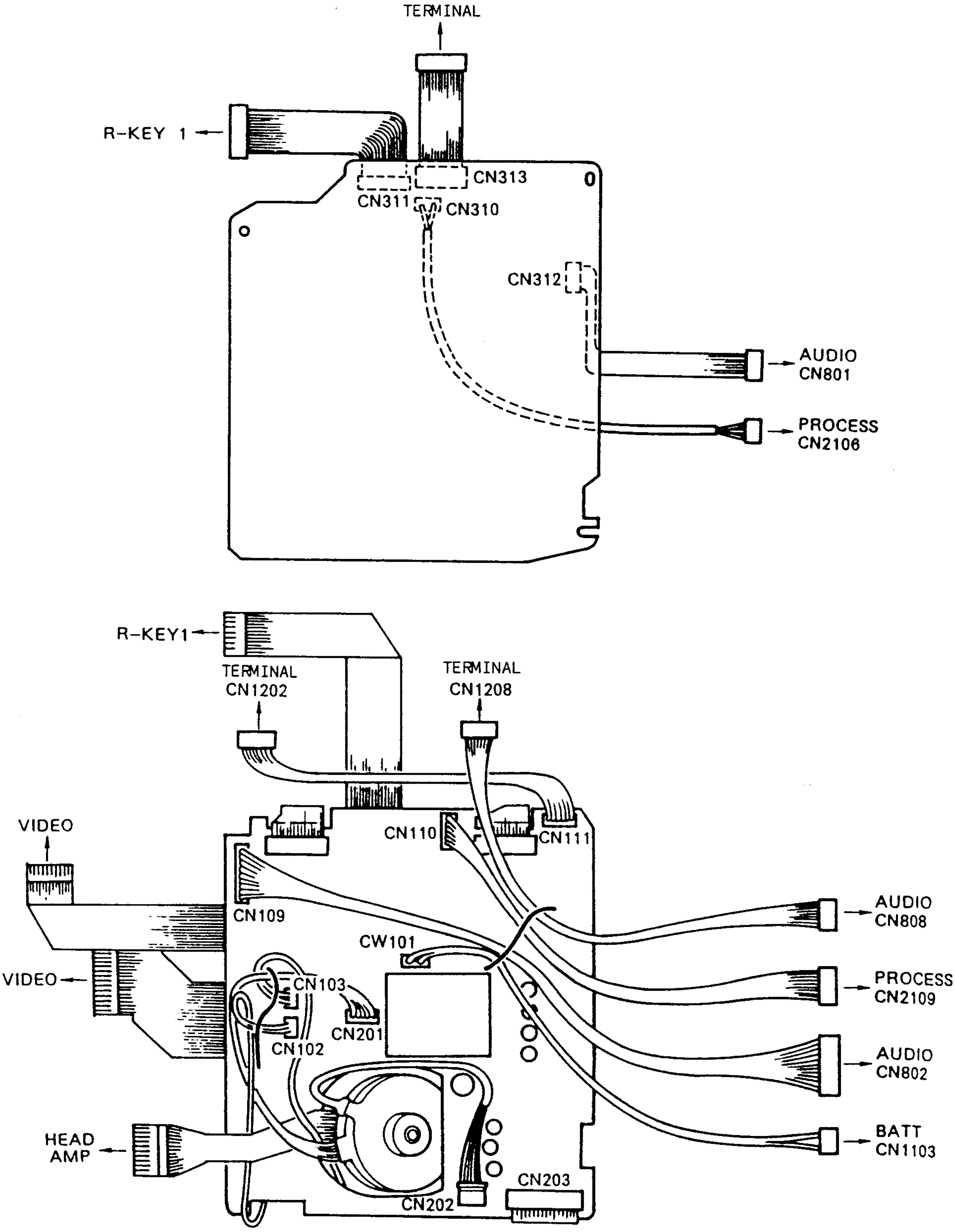

TERMINAL
R-KEY 1
CN313
CN311
CN310
CN312
AUDIO CN801
PROCESS CN2106
R-KEY1
TERMINAL CN1202
TERMINAL CN1208
VIDEO
CN110
CN111
CN109
VIDEO
CW101
CN103
CN201
CN102
HEAD AMP
CN203
CN202
AUDIO CN808
PROCESS CN2109
AUDIO CN802
BATT CN1103

Fig. II-40

3. Adjusting the Lens Section

3-1 Optical system

3-1-1 Back focus adjustment

CHART	Siemens test pattern chart, located three meters away
M. EQ.	Monitor TV
TOOL	Phillips screwdriver
ADJ.	Focusing ring, relay lens
SPEC.	Elimination of defocus at T/W ends

Note: Open the aperture fully wherever possible.

(1) Loosen the screw ⓐ.
(2) At the zoom T end, revolve the focusing ring so that image is brought into focus.
(3) At the zoom W end, move the relay lens back and forth so that image is focused.
(4) Repeat steps 2 and 3 until defocus is eliminated at the T/W ends.
(5) Tighten the screw ⓐ.

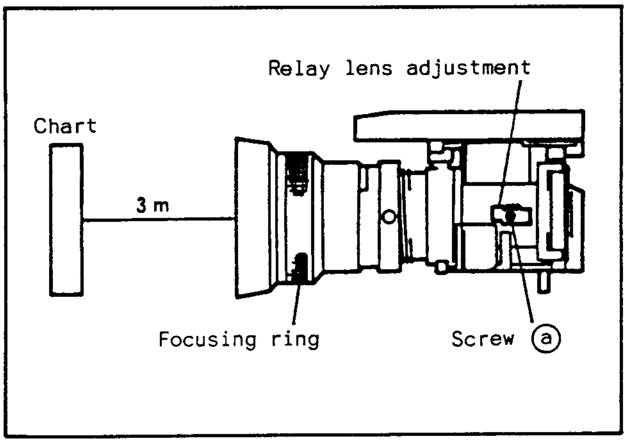


Fig. II-41

3-1-2 Preparation for afocal adjustment

Note: For this adjustment, pick up an actual scene at infinity (150 m or more away) or use the collimator. Described below is the preparatory procedure for this adjustment using the single-lens reflex camera and lens (focal length; 400 mm or more recommended) instead of collimator.

CHART	Ground glass (approx. 30 mm x 40 mm)
TOOL	Single-lens reflex camera, lens (with a focal length of 200 mm or more), magnifier

(1) Release the shutter of single-lens reflex camera fully and open the rear lid.

Note: If the shutter is equipped with a valve mechanism, lock it for opening the aperture with the shutter. If not (e.g. Canon T series), open the aperture using the slow shutter function and take out the internal battery. Thus, the aperture can be left open.

(2) Secure the ground glass to the inside rail face by pressing it.

Note: The ground surface of glass must face the lens side.

(3) Shoot a scene at infinity. By enlarging its image on the ground glass through the magnifier, check if the image is in sharp focus.

Note: For a distance that can be regarded as being infinite, refer to the formula shown in Fig. II-42.

(4) After the above check, remove the ground glass once and mark cross hairlines on it. Then attach it to the camera again.

Note: Use of this substitute for collimator ensures an accurate back focus adjustment in a short time.

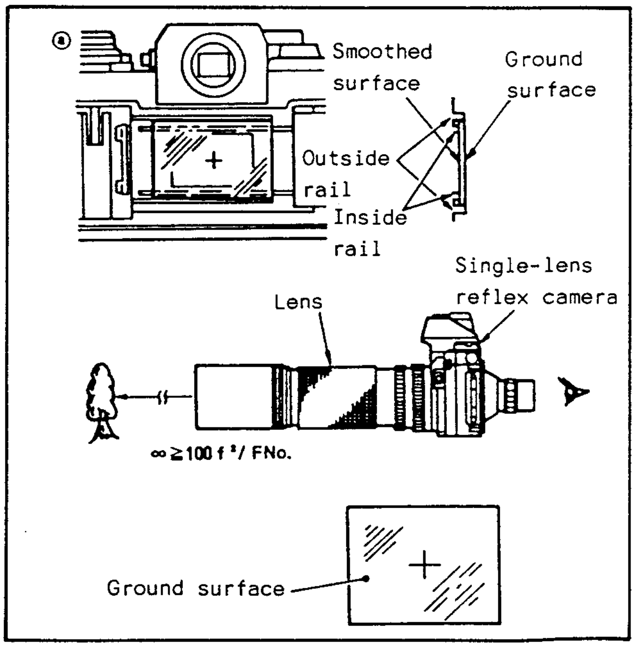


Fig. II-42

3-1-3 Afocal adjustment

Note: Carry out this adjustment only after replacement of the focus lens assembly.
Described below is the adjustment procedure using the single-lens reflex camera instead of collimator.

CHART	Ground glass (approx. 30 mm by 40 mm)
M. EQ.	Monitor TV
TOOL	Single-lens reflex camera/lens (with a focal length of 200 mm or more), Phillips screwdriver
ADJ.	Focusing lens, relay lens
SPEC.	Elimination of T/W-end defocus at infinity

(1) Oppose A1 correctly with the substitutive collimator (prepared in 3-1-2). Align the optical axis between the two lenses as accurately as possible.
(2) Loosen screws ⓐ and ⓑ.
(3) At the zoom T end, adjust focus by using the front lens. In this step, hold the focusing ring at the infinity (∞) stopper and turn only the concave helicoid located inside the focusing ring.
(4) At the zoom W end, move the relay lens back and forth so as to bring the object into just focus.
(5) Repeat steps (3) and (4) until defocus is eliminated at T/W ends.
(6) Tighten screws ⓐ and ⓑ, and confirm the absence of defocus.
(7) Apply the screw lock at the specified location.

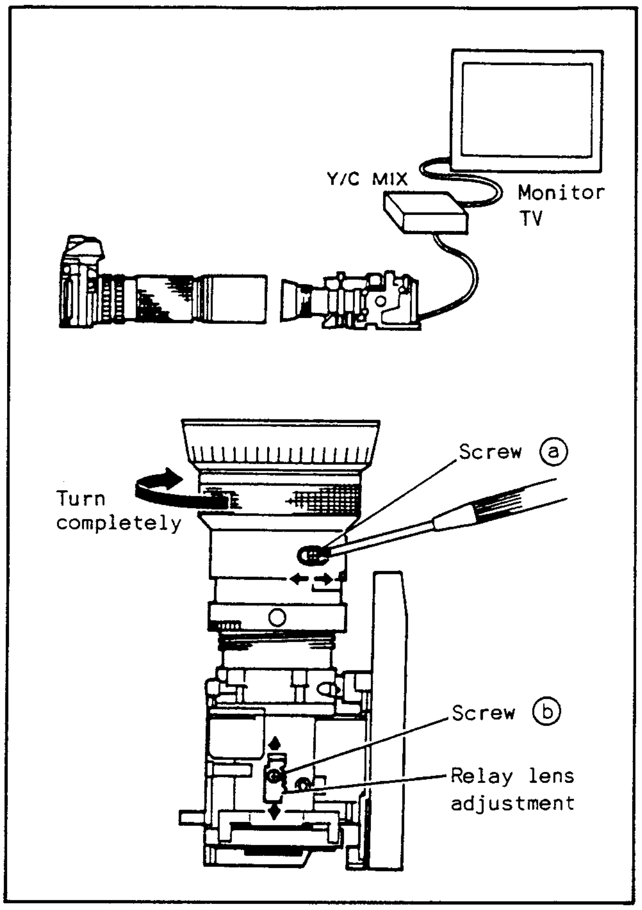


Fig. II-43

3-2 Auto focus adjustments

3-2-1 Microcomputer clock adjustment

MODE	AF
M. EQ.	Oscilloscope
TP/TRIG.	AF CBA TP2608(PLS4)/TP2609(WHD)
ADJ.	AF CBA VC2601(CLK)
SPEC.	9.6 ± 0.4 μS

Procedures:

(1) Make adjustment so that signal appears between TP2608 and TP2609 is as shown in Fig. II-44.

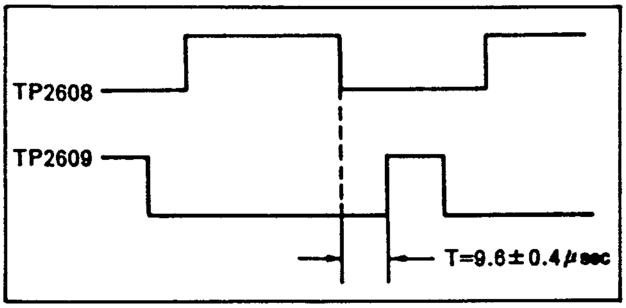


Fig. II-44 10 μS/0.5 V

3-2-2 Bimorph (piezo) amplitude adjustment

MODE	Manual focus mode
M. EQ.	Oscilloscope
TP/TRIG.	PD CBA TP2701(PIEZO)
ADJ.	PD CBA VR2701(PIEZO AMP)
SPEC.	16 ± 0.5 V

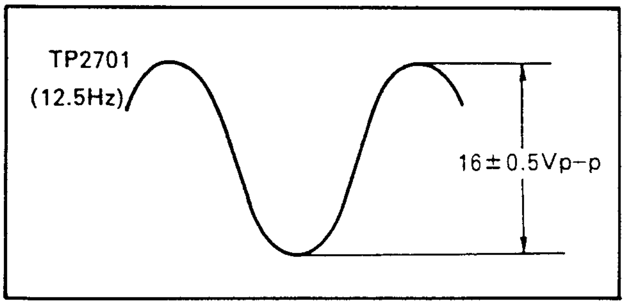


Fig. II-45

3-2-3 Iris encoder adjustment

Check and adjust with reference to 4-3 "Iris encoder". (See P. II-19.)

3-2-4 VH•f time adjustment

CHART	WHITE/GRAY CHART (Attached)
MODE	AF IRIS OPENED TP2411(IG)P ◄─► TP2105(5V)F.
M. EQ.	Oscilloscope
TOOL	Illuminationlamp
TP/TRIG.	PRO CBA TP2201(Y IRIS)G/ TP2104(FH/2)E PRO CBA TP2051(VH)A
ADJ.	AF CBA VC2602(VDf)
SPEC.	2.55 ± 0.05 V

Procedures:

(1) With the telephoto-end zoom setting, shoot the white/gray chart.

(2) Adjust the distance of illumination lamp so that the TP2201 is at 170 mV with the iris open. (See Fig. II-46.)
* Manual iris setting not acceptable.

(3) Observe the TP2051 at the V rate.

(4) Adjust the DC level of waveform to 2.55 ± 0.05 V at VC2602.

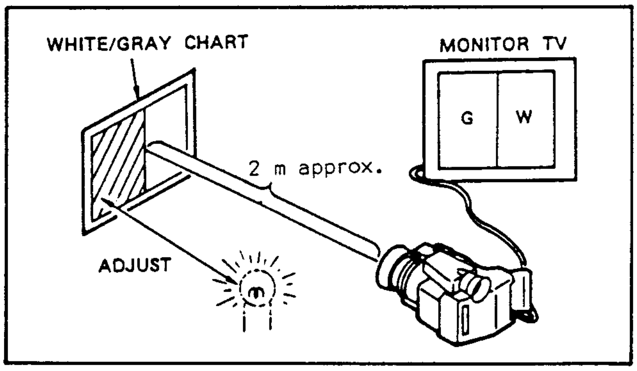


Fig. II-46

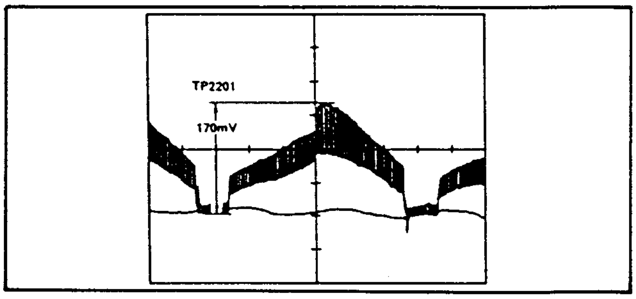


Fig. II-47 10 μS/5 mV

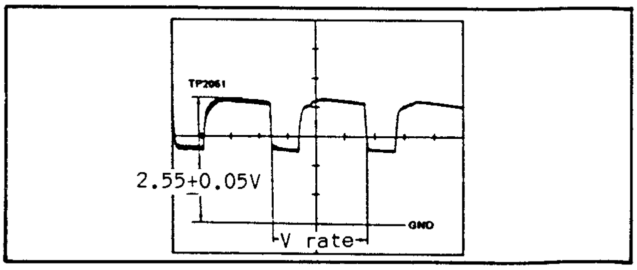


Fig. II-48 5 mS/50 mV

4. Electrical Adjustments of Camera Section

Note: Manual setting of IRIS OPENED/CLOSED acceptable.

4-1 Clock frequency adjustment

M. EQ.	Frequency counter Note: Measure via oscilloscope.
TP/TRIG.	PRO CBA TP2101(CLK)B
ADJ.	PRO CBA VC2101(CLK)
SPEC.	12.87499-12.87501 MHz

4-2 PLL adjustment

M. EQ.	Digital voltmeter
TP/TRIG.	PRO CBA TP2103(PLL)D
ADJ.	PRO CBA VC2102(PLL)
SPEC.	2.5 ± 0.1 V

4-3 Iris encoder adjustment

M. EQ.	Digital voltmeter
TP/TRIG.	PRO CBA TP2412(F OUT)M

Close voltage

MODE	IRIS CLOSED TP2411(IG)P ←→ GND.
ADJ.	AF CBA VR2601 (OFF SET)
SPEC.	$1.74^{+0.01}_{-0.02}$ V

Open voltage

MODE	IRIS OPENED TP2411(IG)P ←→ TP2105(5V)F.
ADJ.	AF CBA VR2602(GAIN)
SPEC.	3.72 ± 0.02 V

Note: Repeat adjustment until specification is met with the iris opened and closed.

4-4 Auto iris adjustment

CHART	Gray scale (5600K)
M. EQ.	Oscilloscope
TP/TRIG.	TP2201(Y IRIS)G/TP2104(FH/2)E
ADJ.	PRO CBA VR2201(IRIS)
SPEC.	250 ± 20 mV

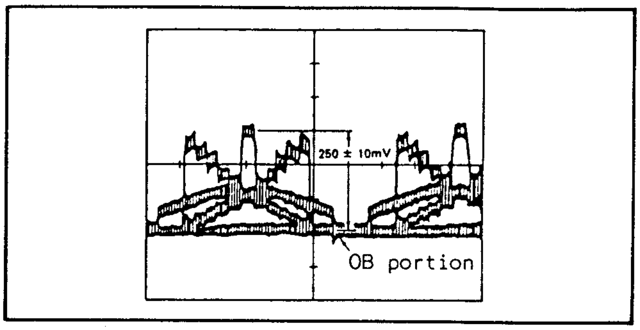


Fig. II-49 10 µs/10 mV

4-5 Y2H level adjustment

CHART	Gray scale (5600K)
M. EQ.	Oscilloscope (ADD mode, CH-2 INV.)
TP/TRIG.	TP2205(Y2H)H TP2206(YOH)I / TP2104(FH/2)E
ADJ.	PRO CBA VR2203(Y2H LEV)
SPEC.	Minimize signal component

Note: Set the oscilloscope as shown below.
5 mV between TP2205 and CH-1 } in ADD
5 mV between TP2206 and CH-2 } mode
(INV.)

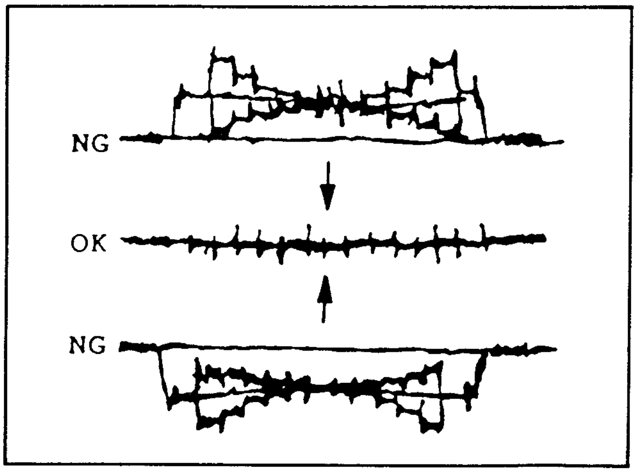


Fig. II-50 10 µs/5 mV

4-6 Setup adjustment

MODE	IRIS CLOSED TP2411(IG)P ←→ GND
M. EQ.	Oscilloscope
TP/TRIG.	TP2302(Y OUT)J/TP2104(FH/2)E
ADJ.	PRO CBA VR2207(OB SET)
SPEC.	40 ± 20 mV

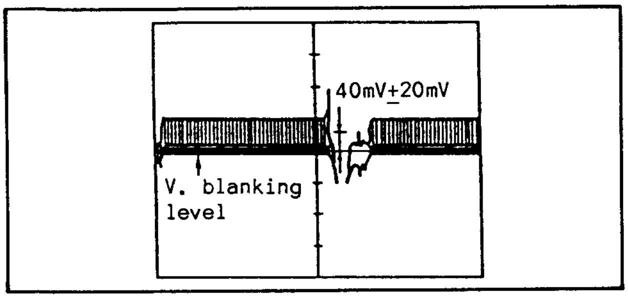


Fig. II-51 10 μs/5 mV

4-7 V aperture adjustment

CHART	Gray sclae (5600K)
M. EQ.	Oscilloscope
TP/TRIG.	TP2304(V.AP)K/TP2104(FH/2)E
ADJ.	PRO CBA VR2204(Y1H LEV)
SPEC.	Minimize signal component

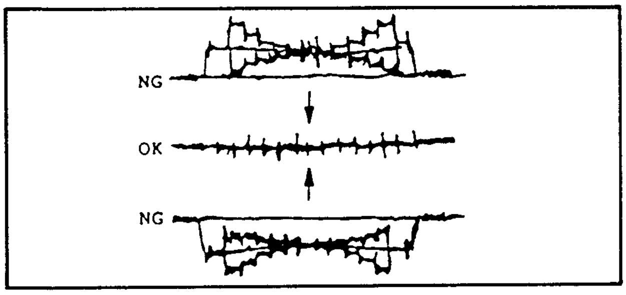


Fig. II-52 10 μs/5 mV

4-8 Y level adjustment

CHART	Gray scale (5600K)
M. EQ.	Oscilloscope
TP/TRIG.	TP2302(Y OUT)J/TP2104(FH/2)E
ADJ.	PRO CBA VR2202(Y LEV)
SPEC.	1200 ± 40 mV

Note: Prior to this adjustment, white clip must be released.
For adjustment, select a waveform having a higher center peak.

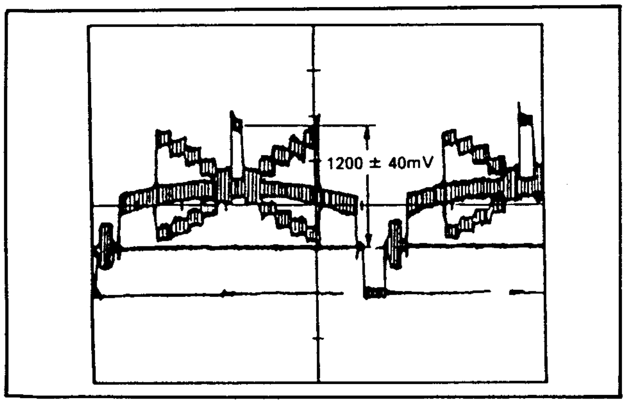


Fig. II-53 10 μs/50 mV

4-9 White clip adjustment

CHART	Window chart
M. EQ.	Oscilloscope
TP/TRIG.	TP2302(Y OUT)J/TP2104(FH/2)E
ADJ.	PRO CBA VR2304(W CLIP)
SPEC.	1500 ± 40 mV

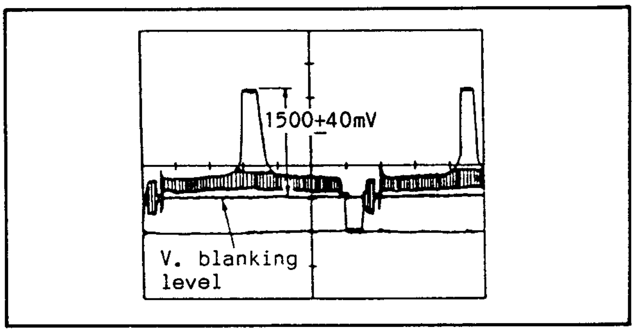


Fig. II-54 10 μs/50 mV

4-10 Blooming adjustment

CHART	U-pattern chart (with white paper)
MODE	IRIS OPENED TP2411(IG)P ←→ TP2105(5V)F.
M. EQ.	Oscilloscope
TOOL	ND-2.0 filter (DY9-2044-000) Halogen lamp, white paper (thin one) Fixture (accessory)
TP/TRIG.	TP2201(Y IRIS)G/TP2104(FH/2)E
ADJ.	PRO CBA VR2101(V SUB)
SPEC.	Suppress blooming

Notes:
1. Conduct this adjustment only at the time of CCD replacement. When replacing the PROCESS C.B.A., measure voltage at CCD pin 20 (V SUB) in advance. After mounting a new C.B.A., adjust the VR2101 to make the pin voltage same as that measured in advance.
2. If 250 mV cannot be achieved in procedure 6, reduce the thickness of white paper to be attached on the back face of U-pattern chart.

Procedures:
(1) Open the iris.
(2) Attach the ND-2.0 filter at the front of lens with the fixture.
(3) Prepare a U-pattern chart with white paper attached on its back face.

(4) Make setting as shown in Fig. II-55.

(5) Shoot the U-pattern chart,at the standard angle of view.

(6) Adjust the location of halogen lamp so that the signal level at TP2201 becomes 250 mV.
On this occasion, also adjust the angle of halogen lamp so as to obtain a waveform as shown in Fig. II-56.

(7) In this status, remove the ND-2.0 filter and observe the monitor TV. (See Fig. II-57.)

(8) Adjust VR2101 to a point where blooming is suppressed.

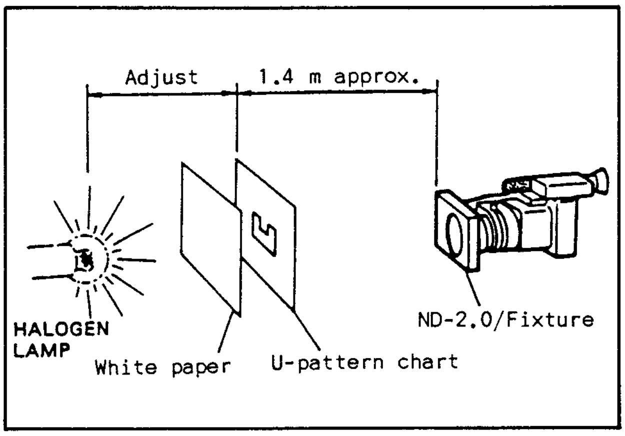

Adjust
1.4 m approx.
HALOGEN LAMP
White paper
U-pattern chart
ND-2.0/Fixture

Fig. II-55

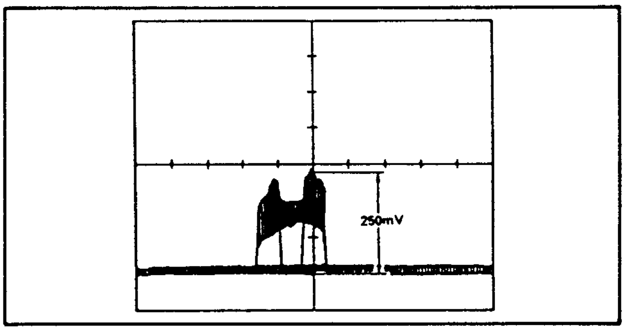


Fig. II-56 10 µs/10 mV

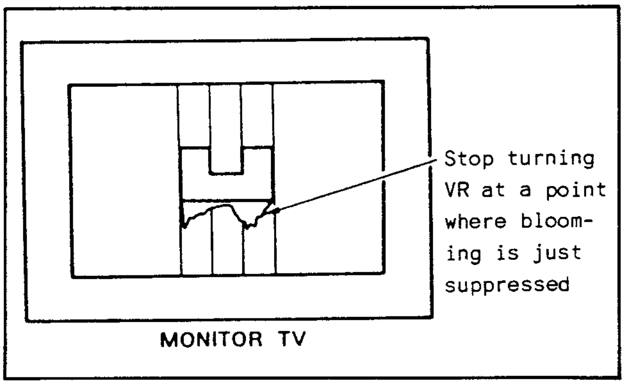

Stop turning VR at a point where blooming is just suppressed
MONITOR TV

Fig. II-57

4-11 Color difference Gain/Modulation axis adjustemnts

CHART	Color bar (5600K)
MODE	AWB PRESET TP2415(PRESET)Q ←→ TP2105(5V)F
M. EQ.	Vectorscope
ADJ.	PRO CBA VR2206(C1H LEV) PRO CBA VR2303 (BURST φ) PRO CBA VR2103 (SC 90)
SPEC.	° Overlay each bright dot Acceptable dot split: Phase 5° or less Gain 10% or less ° Burst phase: 135 ± 2°

Notes: 1. Measure dot split according to Fig. II-58.
2. Adjust R, Ye and G mainly.
3. Both of two specification value (dot split/burst phase) must be obtained at the same time.

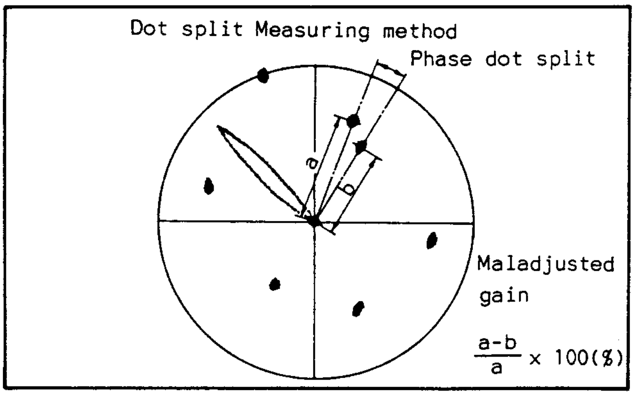

Dot split Measuring method
Phase dot split
a
b
Maladjusted gain
$\frac{a-b}{a} \times 100(\%)$

Fig. II-58

4-12 Carrier balance adjustment

CHART	Gray scale (5600K), lens cap
MODE	AWB PRESET TP2415(PRESET)Q ←→ TP2105(5V)F
M. EQ.	Vectorscope
ADJ.	PRO CBA VR2301(B-Y CB) VR2302(R-Y CB)
SPEC.	Bright dot to be centered

Procedures:

(1) Set AE lock with a gray scale shoot other object to confirm that the iris does not move.

(2) Attach the lens cap.

(3) Move the bright dot to the center by manipulating VR2301 and VR2302.

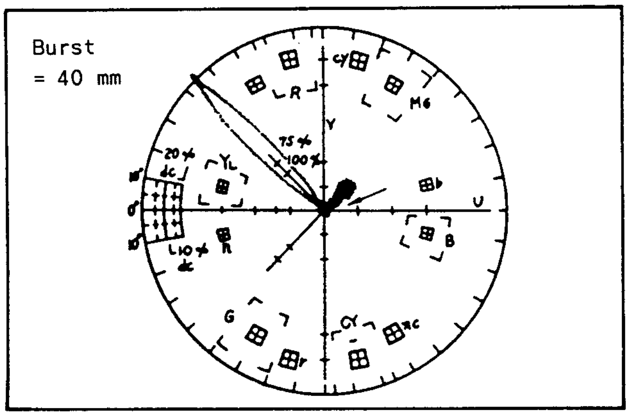


Fig. II-59

4-13 Chroma suppress adjustment

CHART	Color bar (5600K), White chart (5600K)
MODE	W. BALANCE setting
M. EQ.	Oscilloscope, Vectorscope
TP/TRIG.	TP2201(Y IRIS)G/TP2104(FH/2)E
ADJ.	PRO CBA VR2051(C SUP)
SPEC.	Adjustment to a point where Ye suppression begins on vectorscope

Notes:

1. Disconnect TP2415(PRESET Q) ←→ TP2105(5V)F.
2. Release AE lock mode.
3. If the bright dot cannot be centered in procedure 1, carry out 4-15 "FAWB (step 1)" as a temporary AWB adjustment. In this case, confirm 1-0 through 1-4 by observing TP2401 to TP2407 and IC2403 pin 38. Adjustment is possible without connecting to the recorder. After adjustment, disconnect TP2408 and GND.

Procedures:

(1) Shoot the white chart (5600K) and set W. BAL.

(2) Shoot the color bar chart (5600K).

(3) Observe signal at TP2201.

(4) Turn ZOOM toward WIDE so that Ye level becomes 300 mVp-p.

(5) Adjust VR2501 to a point just before the Ye bright dot on the vectorscope begins moving toward the center.

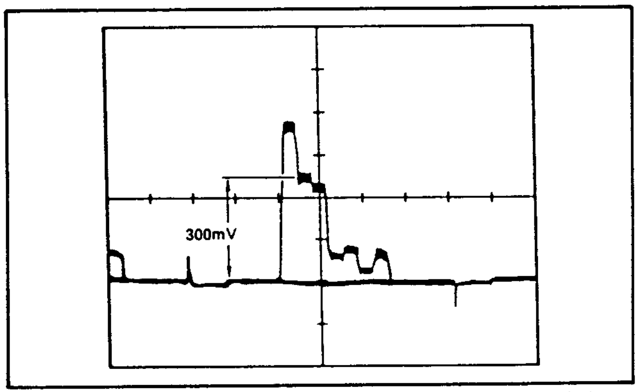


Fig. II-60 10 µs/10 mV

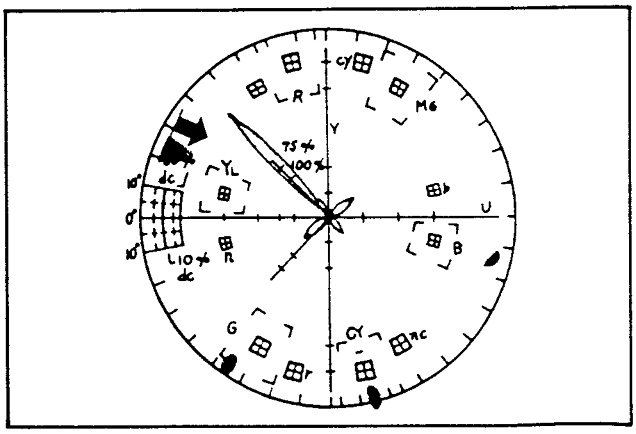


Fig. II-61

4-14 Color balance adjustment

CHART	Color bar (5600K), White chart (5600K)
MODE	W. BALANCE setting
M. EQ.	Vectorscope
ADJ.	PRO CBA VR2401(R GAIN) VR2402(B GAIN)
SPEC.	Color phase Gain (with respect to burst) R 102 ± 4° 1.6 ± 0.1 times Ye 166 ± 6° 1.1 ± 0.2 times G 238 ± 12° 1.0 ± 0.2 times

Note: If the bright dot cannot be centered in procedure 1, carry out 4-15 "FAWB (step 1)" as a temporary AWB adjustment. In this case, confirm 1-0 through 1-4 by observing TP2401 to TP2407 and IC2403 pin 38. Adjustment is possible without connecting to the recorder.
After adjustment, disconnect TP2408 and GND.

Procedures:

(1) Shoot the white chart (5600K) and set W. BAL.

(2) Shoot the color bar chart (5600K) and adjust each bright dot within the specification.

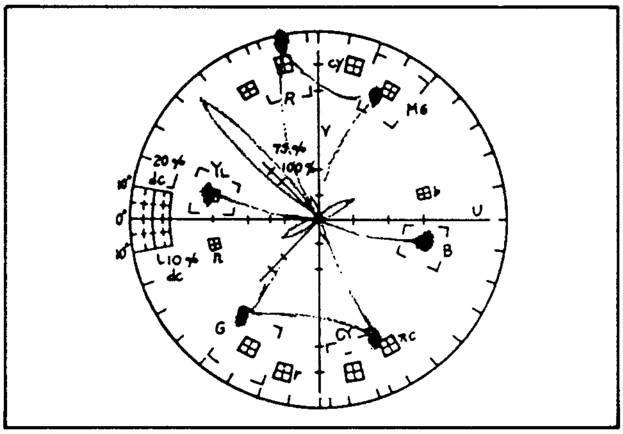


Fig. II-62

4-15 FAWB adjustment

CHART	White chart (3200K halogen lamp radiation)
MODE	AWB adjustment mode (P. II-3) PRO CBA TP2408(MODE SW) ←→ GND
M. EQ.	Vectorscope
TOOL	Halogen lamp 3200K CCB12 filter (DY9-2042-000) CCB8 filter (DY9-2043-000) Fixture (attached)
TP/TRIG.	Monitor TV
ADJ.	Camera key

Notes:
1. Be sure to perform the adjustment in a dark room to protect the AWB sensor from external light.
2. Attach the filter at the front of lens with the fixture.
3. Push the "PUSH AF" SW after 6 seconds or more passed since the CCB filter attached in each step.

Procedures:

(1) Make setting as Fig. II-63.

(2) Connect TP2408 to ground.
Set the camera in the AWB adjustment mode. (See P. II-3).

(3) Carry out FAWB adjustment.
* Usually activate FAWB adjustment mode (1). ..... P. II-24
After adjustment, disconnect TP2408 ←→ GND.

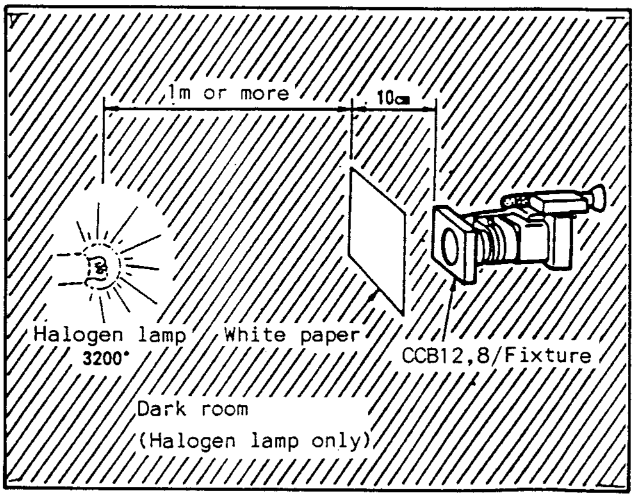
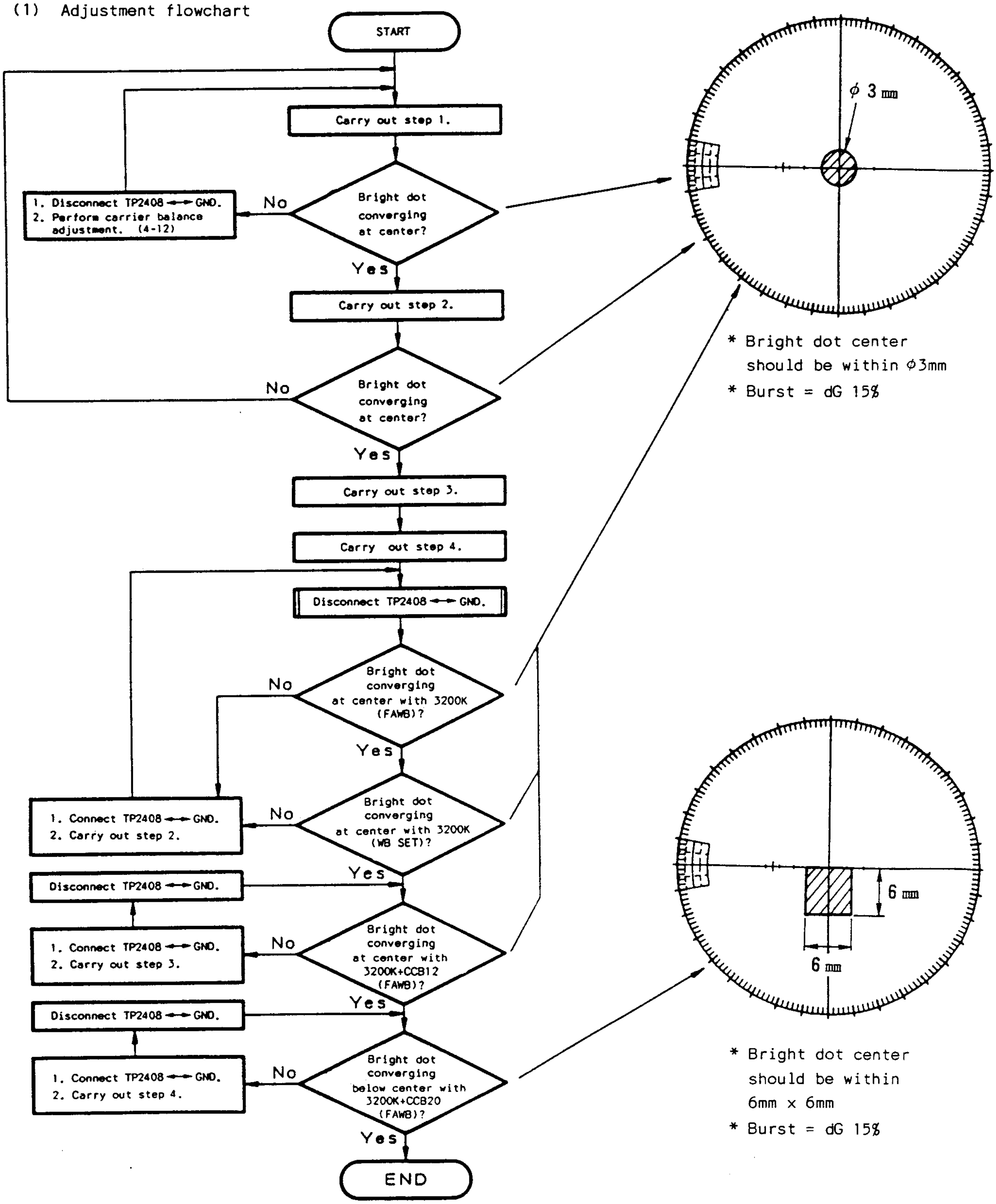


Fig. II-63

4-15-1 FAWB adjustment mode (1)

- According to the adjustment flowchart shown below, carry out steps 1 through 4 and check the adjusted conditions.
- At each step, conduct adjustment while observing the monitor screen and vectorscope.
- If a procedural error is made during each step, retry from the beginning of relevant step. For this purpose, terminate the relevant step prematurely and go back to its beginning.

(1) Adjustment flowchart


START
Carry out step 1.
Bright dot converging at center?
No
1. Disconnect TP2408 ←→ GND.
2. Perform carrier balance adjustment. (4-12)
Yes
Carry out step 2.
Bright dot converging at center?
No
Yes
Carry out step 3.
Carry out step 4.
Disconnect TP2408 ←→ GND.
Bright dot converging at center with 3200K (FAWB)?
No
Yes
Bright dot converging at center with 3200K (WB SET)?
No
1. Connect TP2408 ←→ GND.
2. Carry out step 2.
Yes
Disconnect TP2408 ←→ GND.
Bright dot converging at center with 3200K+CCB12 (FAWB)?
No
1. Connect TP2408 ←→ GND.
2. Carry out step 3.
Yes
Disconnect TP2408 ←→ GND.
Bright dot converging below center with 3200K+CCB20 (FAWB)?
No
1. Connect TP2408 ←→ GND.
2. Carry out step 4.
Yes
END
φ 3 mm
6 mm
6 mm

* Bright dot center should be within φ3mm

* Burst = dG 15%

* Bright dot center should be within 6mm x 6mm

* Burst = dG 15%

[FAWB adjsutment mode (1)]

° Perform steps 1 through 4 according procedures listed below.
° Utilize screen display or status output (TP) for confirmation of each step.

Table II-1 (1/2)

Steps			Procedures	Screen displays	Status output of camera							
					TP2407	TP2406	TP2405	TP2404	TP2403	TP2402	TP2401	IC2403 pin 38
Step 1		1-0	1) Ground TP2408 (MODE SW).	SETUP CAMERA STEP "1" LENS-CAP START?	1	0	0	0	0	0	0	0
		1-1	1) Apply AE lock on white chart. (EXP. M) 2) Make sure character "1" flickers and then remains lit.	STEP 1 LENS-CAP	1	0	0	0	0	0	0	1
		1-2	1) Attach lens cap. 2) Press "PUSH AF" SW.	WORKING	1	0	0	1	0	0	0	-
		1-3	After about 1 sec, display at right column appears.	OK!-WRITE?	1	0	0	0	1	0	0	-
		1-4	1) Press "PUSH AF" SW.	WORKING	1	0	1	0	0	0	0	-
		1-5	1) After about 0.5 sec, display at right column appears. 2) Confirm that bright dot is located at the center of vectorscope. * If not, reconfirm the adjustment in 4-12 "Carrier balance".	COMPLETE!	1	0	0	0	1	0	0	-
	If defective unit	1-3'	° Display at right column appears at about 1 sec after the status in 1-2. * If NG persists even after repeating 1-2, AWB sensor may be defective or filter may be wrong.	NG! TRY AGAIN!	1	1	0	0	0	0	0	-
		1-5'	° Display at right column apepars at about 0.5 sec after the status in 1-4. * Repeat procedures from 1-2. If NG recurs, IC2402 (E^2 PROM) may be defective.	WORKING	1	0	0	1	0	0	0	-

Table II-1 (2/2)

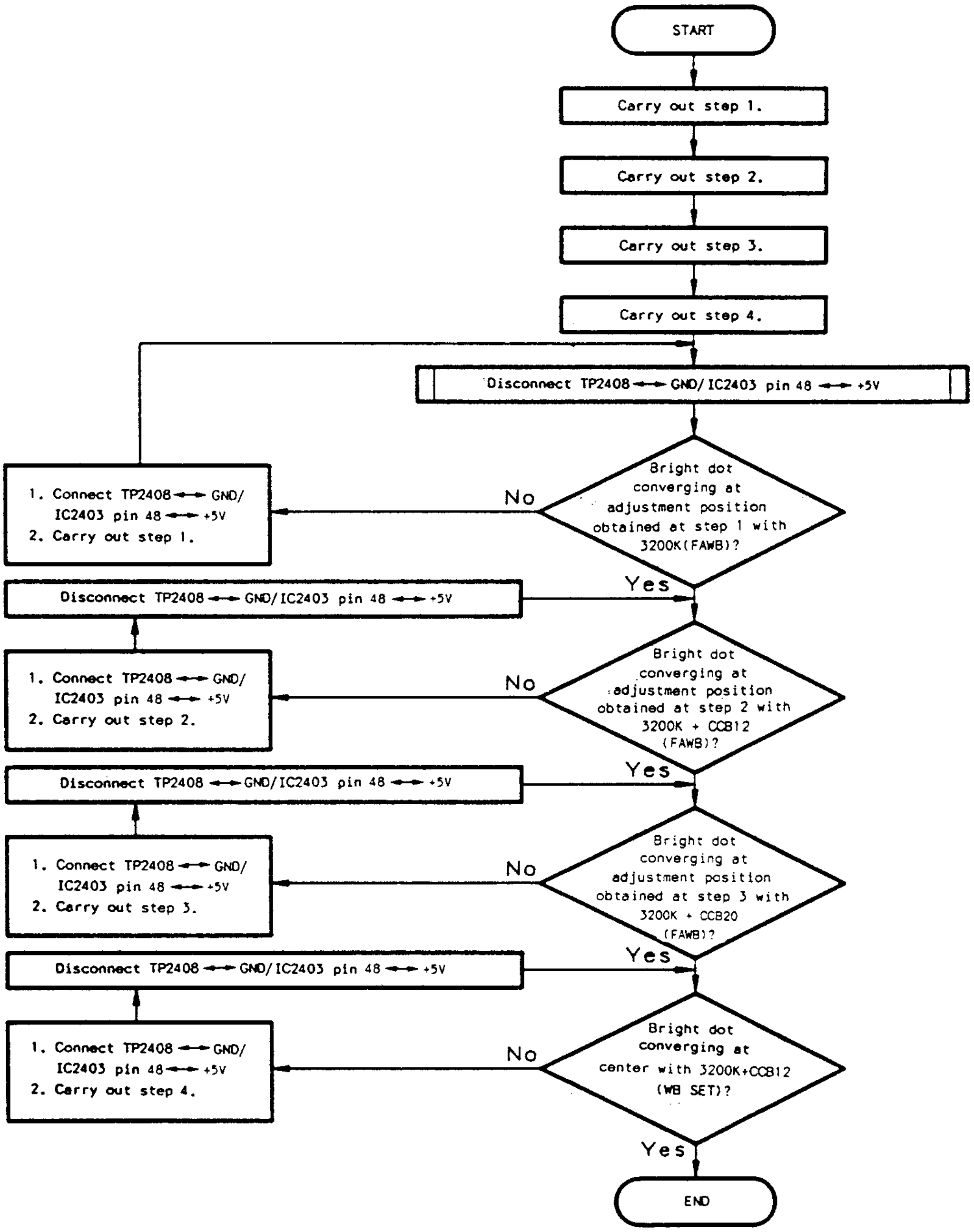
Steps		Procedures	Screen displays	Status output of camera							
				TP2407	TP2406	TP2405	TP2404	TP2403	TP2402	TP2401	
Step 2	2-1	1) Procedures "CONTROL ⊕" SW. 2) Arrange conditions; 3200K and white chart.	STEP 2 3200K START?	1	0	0	0	0	0	1	-
	2-2 | 2-5 2-3' 2-5'	Same as 1-2 through 1-5, and 1-3' and 1-5'	STEP 2 3200K (Same as step 1)		Same as step 1				0	1	-
Step 3	3-1	1) Press "CONTROL ⊕" SW. 2) Arrange conditions; 3200K, white chart and CCB12.	STEP 3 3200K+CCB12 START?	1	0	0	0	0	1	0	-
	3-2 | 3-5 3-3' 3-5'	Same as 1-2 through 1-5, and 1-3' and 1-5'	STEP 3 3200K+CCB12 (Same as step 1)		Same as step 1				1	0	-
Step 4	4-1	1) Press "CONTROL ⊕" SW. 2) Arrange conditions; 3200K, white chart, CCB12 and CCB8.	STEP 4 3200K+CCB20 START?	1	0	0	0	0	1	1	-
	4-2 | 4-5 4-3' 4-5	Same as 1-2 through 1-5, and 1-3' and 1-5'	STEP 4 3200K+CCB20 (Same as step 1)		Same as step 1				1	1	-

4-15-2 FAWB adjustment mode (2)

- The bright dot converging position in FAWB can be adjusted arbitrarily.
- According to the adjustment flowchart shown below, carry out steps 1 through 4 and check the adjusted conditions.
- At each step, conduct adjustment while observing the monitor screen and vectorscope.
- If a procedural error is made during each step, retry from the beginning of relevant step. For this purpose, terminate the relevant step prematurely and go back to its beginning.

(1) Adjustment flowchart

* Note: Before the following adjustment, be sure to remove R2477 (0 Ω), and connect pin 48 and Camera 5V (IC2403).


START
Carry out step 1.
Carry out step 2.
Carry out step 3.
Carry out step 4.
Disconnect TP2408 ↔ GND/IC2403 pin 48 ↔ +5V
Bright dot converging at adjustment position obtained at step 1 with 3200K(FAWB)?
No
1. Connect TP2408 ↔ GND/ IC2403 pin 48 ↔ +5V
2. Carry out step 1.
Yes
Disconnect TP2408 ↔ GND/IC2403 pin 48 ↔ +5V
Bright dot converging at adjustment position obtained at step 2 with 3200K + CCB12 (FAWB)?
No
1. Connect TP2408 ↔ GND/ IC2403 pin 48 ↔ +5V
2. Carry out step 2.
Yes
Disconnect TP2408 ↔ GND/IC2403 pin 48 ↔ +5V
Bright dot converging at adjustment position obtained at step 3 with 3200K + CCB20 (FAWB)?
No
1. Connect TP2408 ↔ GND/ IC2403 pin 48 ↔ +5V
2. Carry out step 3.
Yes
Disconnect TP2408 ↔ GND/IC2403 pin 48 ↔ +5V
Bright dot converging at center with 3200K+CCB12 (WB SET)?
No
1. Connect TP2408 ↔ GND/ IC2403 pin 48 ↔ +5V
2. Carry out step 4.
Yes
END

[FAWB adjustment mode (2)]

° Perform steps 1 through 4 according to procedures listed below.
° Utilize screen display or status output (TP) for confirmation of each step.

Table II-2 (1/2)

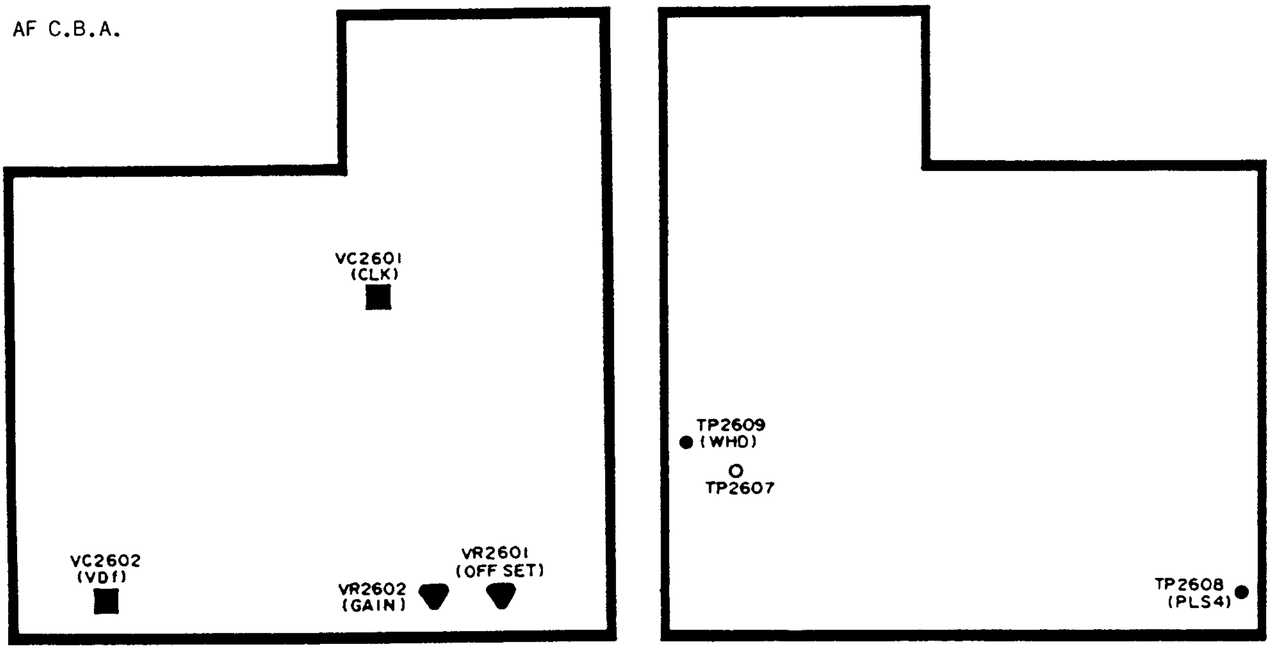
Steps		Procedures	Screen displays	Status output of camera							
				TP2407	TP2406	TP2405	TP2404	TP2403	TP2402	TP2401	
Step 1	1-0	1) Remove R2477 (0 Ω). 2) Connect pin 48 of IC2403 to CAMERA 5V. 3) Ground TP2408 (MODE SW).	SETUP CAMERA STEP 1 3200K START?	1	0	0	0	0	0	0	
	1-1	1) Arrange conditions; 3200K and white chart. 2) Press "PUSH AF" SW. 3) Adjust bright dot to the anywhere by setting "REC SEARCH" ⊕/⊖ switch in the R-Y direction and the "TITLE/DATE" SW set in the B/Y direction.	OK!-WRITE?	1	0	0	1	1	0	0	
	1-2		OK!-WRITE?	1	0	0	1	1	0	0	
	1-3	1) Press "PUSH AF" SW.	WORKING	1	0	1	0	0	0	0	
	1-4	After about 0.5 sec, display at right column appears.	COMPLETE!	1	0	0	0	1	0	0	
If defective	1-1'	° Display at right column appears under the condition in 1-1. * AWB sensor may be defective or filter may be wrong.	NG!-TRY AGAIN	1	1	0	0	0	0	0	
	1-3'	° Display at right column appears about 0.5 sec after the condition in 1-3. * Repeat procedure from 1-1. If NG recurs, IC2402 (E^2 PROM) may be defective.	Same as 1-1 or 1-1'	1 1	0 1	0 0	1 or 0	1 0	0 0	0 0	

Table II-2 (2/2)

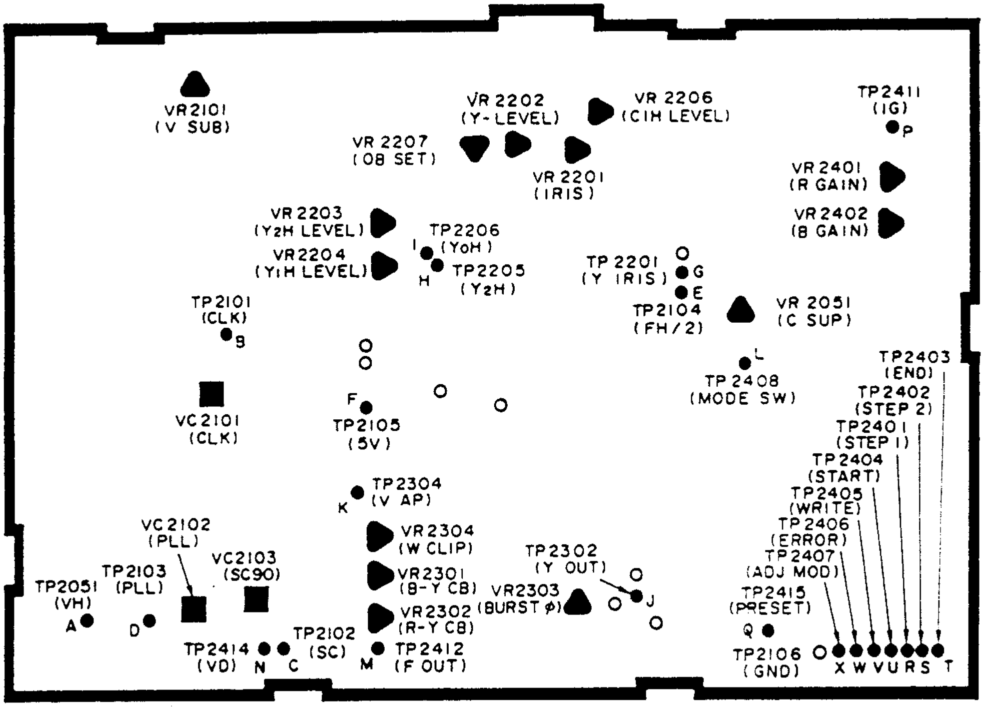
Steps		Procedures	Screen displays	Status output of camera							
				TP2407	TP2406	TP2405	TP2404	TP2403	TP2402	TP2401	
Step 2	2-0	1) Press "CONTROL ⊕" SW. 2) Arrange conditions; 3200K, white chart and CCB12.	STEP 2 3200K+CCB12 START?	1	0	0	0	0	0	1	
	2-1 ↓ 2-4 2-1' 2-3'	Same as 1-1 through 1-4, and 1-1' and 1-3'	STEP 2 3200K+CCB12 (Same as step 1)		Same as step 1				0	1	
Step 3	3-0	1) Press "CONTROL ⊕" SW. 2) Arrange conditions; 3200K, white chart, CCB12 and CCB8.	STEP 3 3200K+CCB20 START?	1	0	0	0	0	1	0	
	3-1 ↓ 3-4 3-1' 3-3'	Same as 1-1 through 1-4, and 1-1' and 1-3'	STEP 3 3200K+CCB20 (Same as step 1)		Same as step 1				1	0	
Step 4	4-0	1) Press "CONTROL ⊕" SW. 2) Arrange conditions; 3200K, white chart and CCB12.	STEP 4 3200K+CCB12 START?	1	0	0	0	0	1	1	
	4-1 | 4-4 4-1' 4-3'	Same as 1-1 through 1-4, and 1-1' and 1-3' * Be sure to set bright dot on center. (WB adjustment.)	STEP 4 3200K+CCB12 (Same as step 1)		Same as step 1				1	1	

List of TPs, VRs and VCs

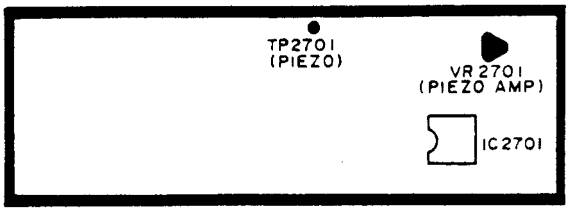
AF C.B.A.


VC2601
(CLK)
VC2602
(VDf)
VR2602
(GAIN)
VR2601
(OFF SET)
TP2609
(WHD)
TP2607
TP2608
(PLS4)

PROCESS C.B.A.


VR2101
(V SUB)
VR 2202
(Y-LEVEL)
VR 2206
(C1H LEVEL)
TP2411
(IG)
P
VR 2207
(OB SET)
VR 2201
(IRIS)
VR 2401
(R GAIN)
VR 2402
(B GAIN)
VR 2203
(Y2H LEVEL)
VR2204
(Y1H LEVEL)
TP2206
(YoH)
I
H
TP2205
(Y2H)
TP 2201
(Y IRIS)
G
E
TP2104
(FH/2)
VR 2051
(C SUP)
TP2101
(CLK)
B
L
TP 2408
(MODE SW)
TP2403
(END)
TP2402
(STEP 2)
TP2401
(STEP 1)
TP2404
(START)
TP2405
(WRITE)
TP 2406
(ERROR)
TP2407
(ADJ MOD)
TP2415
(PRESET)
Q
VC2101
(CLK)
F
TP2105
(5V)
K
TP2304
(V AP)
VC2102
(PLL)
VR2304
(W CLIP)
VC2103
(SC90)
TP2103
(PLL)
TP2051
(VH)
A
D
VR2301
(B-Y CB)
VR2303
(BURST ϕ)
TP2302
(Y OUT)
J
VR2302
(R-Y CB)
TP2102
(SC)
TP2414
(VD)
N
C
M
TP2412
(F OUT)
TP2106
(GND)
X W V U R S T

PIEZO DRIVE C.B.A.


TP2701
(PIEZO)
VR 2701
(PIEZO AMP)
IC2701

5. Electrical Adjustment of Recorder Section

Note: Use color bar signal (signal generator) having no luminance signal.

5-1 SS5V adjustment

MODE	EE
M. EQ.	Digital voltmeter
TP/TRIG.	SS CBA CN204 - 2 pin
ADJ.	SS CBA VR101
SPEC.	5.1 ± 0.05 V

5-2 Undercut adjustment

MODE	REC
M. EQ.	Digital voltmeter, monitor TV
ADJ.	SS CBA VR104
SPEC.	BATT 80 ± 01 H/5.70 ± 0.05 V

Procedures:

(1) Set the line voltage at 5.70 ± 0.05 V.

(2) Short-circuit TP004 and TP001 on the R-KEY1 CBA three times to activate the service mode [step 3].

(3) Make adjustment so that the specified value appears on the monitor. Confirm the "80:10" is displayed.

(4) Set the line voltage at 6 V.

5-3 ATF bias adjustment

MODE	REC PAUSE
M. EQ.	Monitor TV
ADJ.	SS CBA VR201
SPEC.	ATF: 80 ± 01 H

Procedures:

(1) Short-circuit pins 6 (16K) and 7 (47K) of SS CBA CN204 with a capacitor of about 10 µF/10 V.

(2) Short-circuit TP004 and TP001 on R-KEY1 CBA three tiems to activate the service mode [step 3].

(3) Make adjustment so that the specified value appears on the monitor.

5-4 Switching point adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO CBA TP310, R-KEY1 CBA CN006 1 pin
ADJ.	SS CBA VR105
SPEC.	8.5 ± 0.5 H

Procedure:

(1) Make adjustment so as to meet the specified value with the monoscope master tape played back.

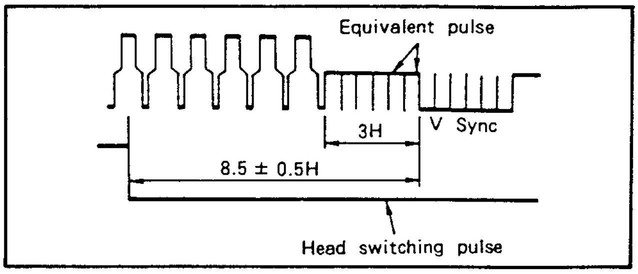


Fig. II-64

5-5 VIDEO 5V adjustment

MODE	EE
M. EQ.	Digital voltmeter
TP/TRIG.	VIDEO CBA TP306
ADJ.	VIDEO CBA VR308
SPEC.	5.1 ± 0.05 V

5-6 Video AGC adjustment

SIGNAL	100% white video signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO CBA TP302
ADJ.	VIDEO CBA VR309
SPEC.	0.5 ± 0.02 V

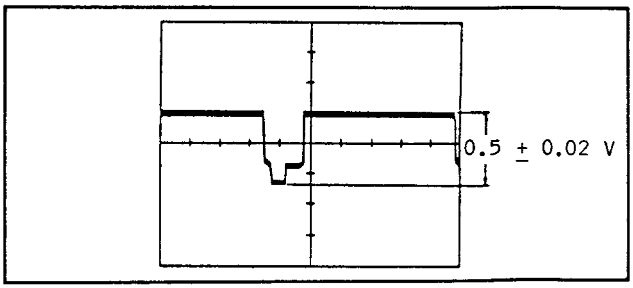


Fig. II-65 20 mV/10 µs

Note: Set the switch of Y/C separator to the Y side.

5-7 YC separation adjustment

SIGNAL MODE	Color bar signal EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO CBA TP305
ADJ.	VIDEO CBA VR316, VL301
SPEC.	Minimize chrominance component

Note: Set the switch of Y/C separator to the C side.

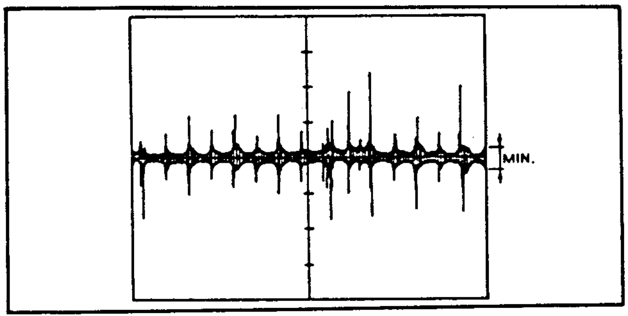


Fig. II-66 5 mV/10 µs

5-8 Video drop-out adjustment

SIGNAL	Video drop-out master (DY9-1064-000)
MODE	PB
M. EQ.	Monitor
ADJ.	VIDEO CBA VR315
SPEC.	Frame connection line inconspicuous on monitor TV

5-9 W/D clip adjustment

SIGNAL	100% white video signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO CBA TP304
ADJ.	VIDEO CBA VR311
SPEC.	225 ± 5%

Note: Set the switch of Y/C separator to the Y side.

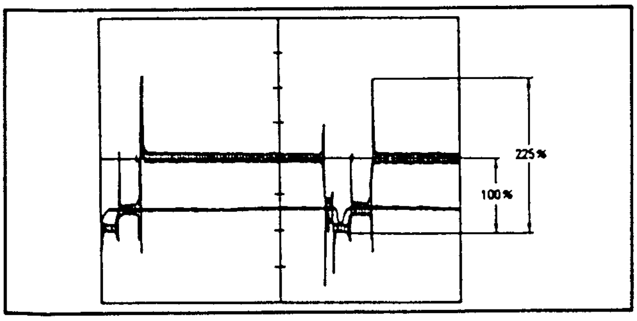


Fig. II-67 5 mV/10 µs

5-10 Y FM carrier adjustment

SIGNAL	With input terminal open
MODE	EE
M. EQ.	Frequency counter
TP/TRIG.	VIDEO CBA TP303
ADJ.	VIDEO CBA VR310
SPEC.	4.2 ± 0.04 MHz

Notes: 1. Connect a frequency counter and a recorder via an osciloscope.
2. Set the switch of Y/C separator to the Y side.

5-11 Y FM deviation adjustment

SIGNAL	100% white video signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO CBA TP303
ADJ.	VIDEO CBA VR312
SPEC.	0.19 µs/1 cycle Graduation 3.8 at 50 ns Div.

Notes: 1. Set the switch of Y/C separator to the C side.
2. Observe the signal waveform whose period is the shortest.

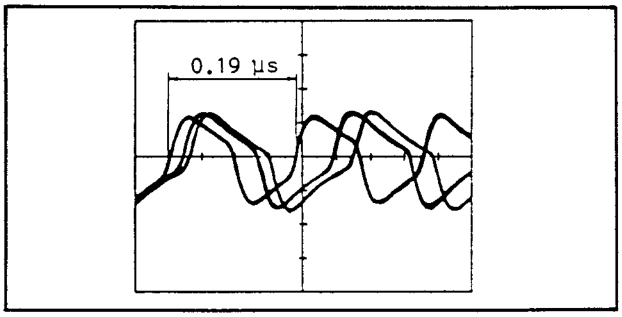


Fig. II-68 5 mV/50 ns

5-12 Sub-carrier frequency adjustment

SIGNAL	Any tape possible
MODE	PB
M. EQ.	Frequency counter
TP/TRIG.	CHROMA CBA TP552
ADJ.	CHROMA CBA VC551
SPEC.	4.433619 MHz ± 30 Hz

Note: Connect a frequency counter and a recorder via an osciloscope.

5-13 VCO free-run frequency adjustment

SIGNAL	Color bar signal
MODE	EE
M. EQ.	Digital voltmeter
TP/TRIG.	CHROMA CBA TP552
ADJ.	CHROMA CBA VR552
SPEC.	3.0 ± 0.2 V

Note: Set the switch of Y/C separator to the C side.

5-14 BM carrier offset adjustment

SIGNAL	Color bar signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	CHROMA CBA TP551
ADJ.	CHROMA CBA VR551
SPEC.	Minimize blanking period

Note: Set the switch of Y/C separator to the C side.

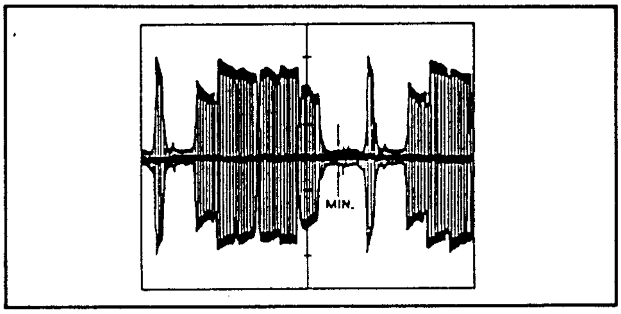


Fig. II-69 10 mV/10 μs

5-15 Chrominance emphasis adjustment

SIGNAL	Color bar signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	CHROMA CBA TP555
ADJ.	CHROMA CBA VL551
SPEC.	Minimize yellow portion at its right end

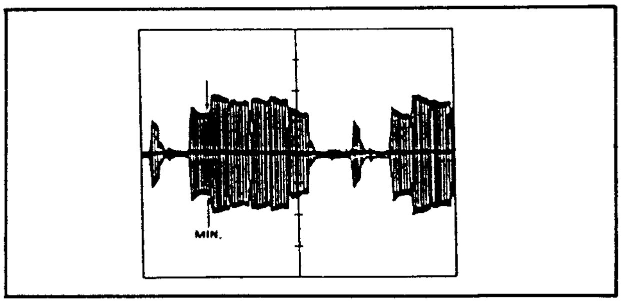


Fig. II-70 20 mV/10 μs

Note: Set the switch of Y/C separator to the C side.

5-16 Recording current adjustment

(1) Luminance signal

SIGNAL	With input terminal open
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	HA CBA TP701
ADJ.	VIDEO CBA VR304
SPEC.	280 ± 10 mVp-p

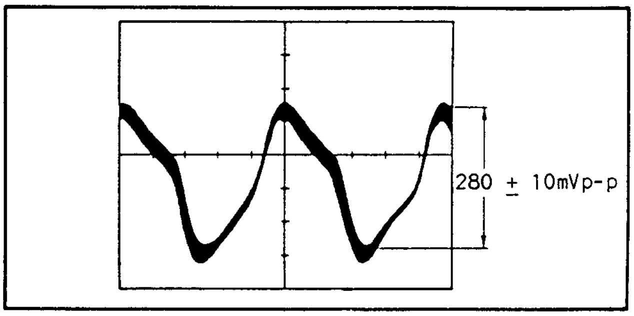


Fig. II-71 5 mV/50 ns

(2) Chrominance, audio and ATF signals

SIGNAL	Color bar signal
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	HA CBA TP701
TOOL	Rec. current checker (DY9-1056-000)

Note: Set the switch of Y/C separator to the C side.

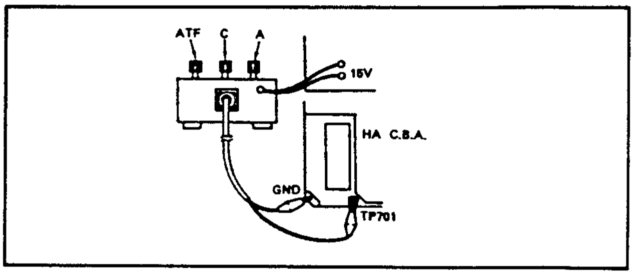


Fig. II-72

Chrominance

ADJ.	VIDEO CBA VR305
SPEC.	1.8 ± 0.1 Vp-p

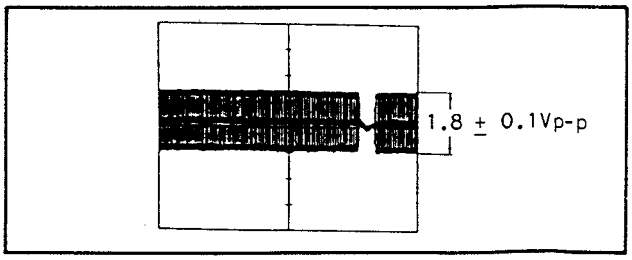


Fig. II-73 50 mV/2 ms

Audio

ADJ.	VIDEO CBA VR306
SPEC.	1.7 ± 0.1 Vp-p

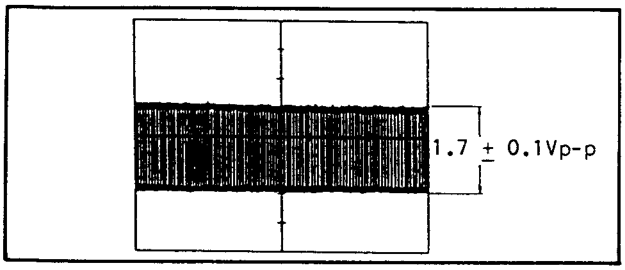


Fig. II-74 50 mV/2 ms

ATF

ADJ.	VIDEO CBA VR307
SPEC.	0.9 ± 0.1 V DC

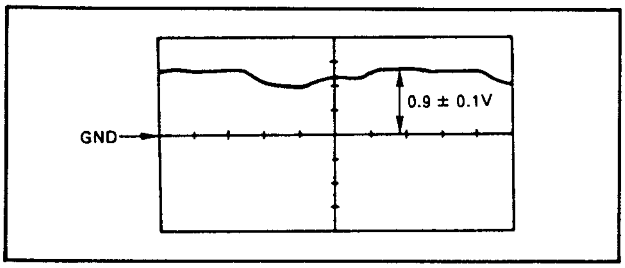


Fig. II-75 20 mV/10 ms

5-17 Playback Y level adjustment

SIGNAL	Self-recorded white 100% signal
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO CBA TP302
ADJ.	VIDEO CBA VR313
SPEC.	0.54 ± 0.02 V

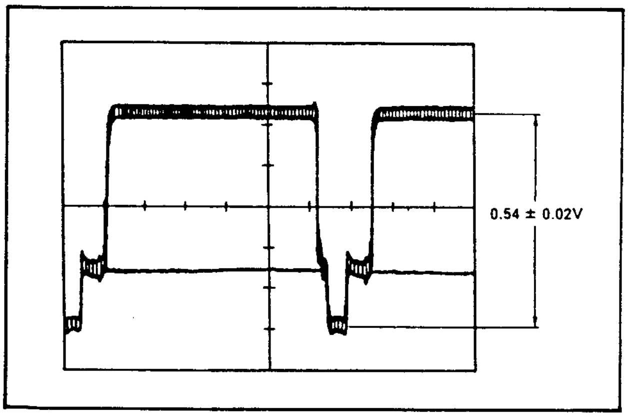


Fig. II-76 10 μs/10 mV

5-18 Character position of character generator adjustment

SIGNAL	Self-recorded color bar signal
MODE	PB
M. EQ.	Monitor TV
ADJ.	VIDEO CBA VC301
SPEC.	Lowermost digit of counter located between red and blue color bars

Note: With the EVF connected, display characters with the remote control.

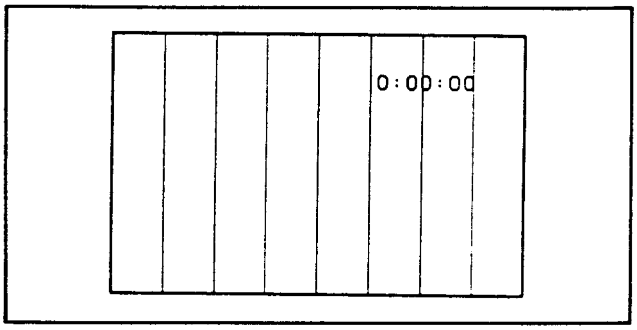
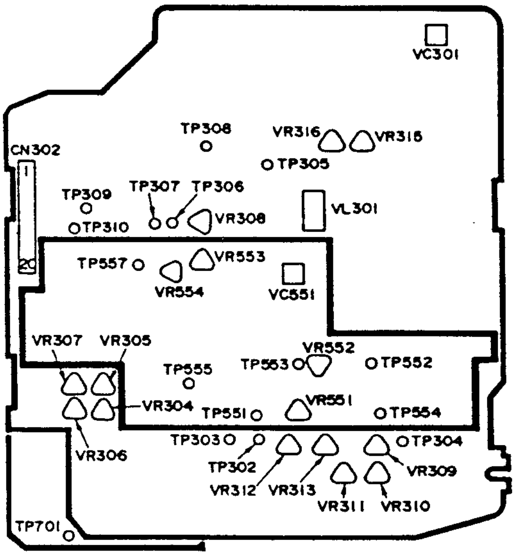


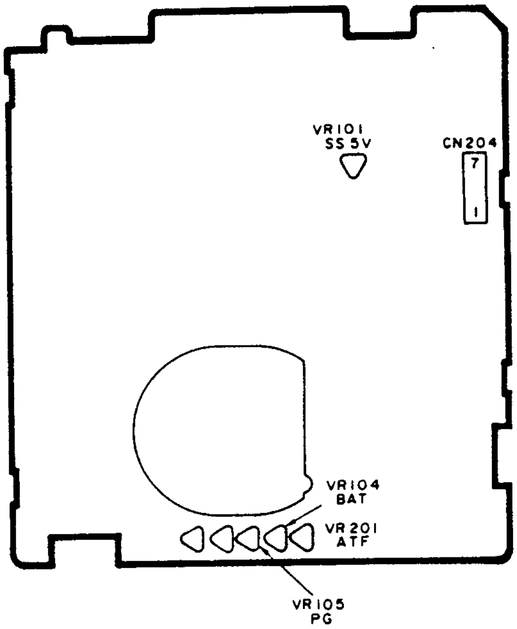
Fig. II-77

List of TPs, VRs and VCs

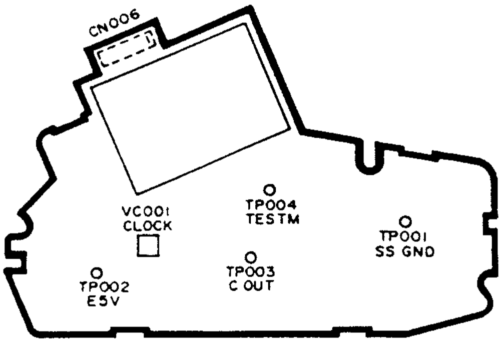
VIDEO C.B.A.


VC301
TP308
VR316
VR315
CN302
1
20
TP305
TP309
TP307
TP306
TP310
VR308
VL301
TP557
VR553
VR554
VC551
VR307
VR305
VR552
TP555
TP553
TP552
VR304
TP551
VR551
TP554
VR306
TP303
TP304
TP302
VR309
VR312
VR313
VR311
VR310
TP701

SYSCON-SERVO C.B.A.


VR101
SS 5V
CN204
7
1
VR104
BAT
VR201
ATF
VR105
PG

R-KEY(1) C.B.A.


CN006
VC001
CLOCK
TP004
TESTM
TP001
SS GND
TP003
C OUT
TP002
E5V

6. EVF Adjustment

6-1 Free-run frequency adjustment

SIGNAL	No signal (terminal open)
MODE	STOP
M. EQ.	Oscilloscope, frequency counter
TP/TRIG.	EVF CBA CN2901 5 pin
ADJ.	EVF CBA VR2901
SPEC.	15.90 ± 0.05 KHz

6-2 Vertical amplitude adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PLAY
M. EQ.	EVF, Monitor TV
ADJ.	EVF CBA VR2902
SPEC.	Circle on monoscope master free from distortion. Absence of incongruity in comparison with monitor TV screen

6-3 Rotation and centering adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PLAY
M. EQ.	EVF
ADJ.	Deflection yoke, centering magnet
SPEC.	Screen is not tilted and located right at the center.

Procedures:

(1) Loosen the fastening ring to enable the deflection yoke to be moved.

(2) Turn the deflection yoke to correct for screen tilt.
Note: Move the deflection yoke completely toward the CRT screen.

(3) Tighten the fastening ring.
Note: The fastening ring must be tightened so that the centering magnet can still be moved.

(4) Adjust the centering magnet so as to locate the picture at the center.

(5) Tighten the fastening ring completely.
Note: Pay attention not to overtighten the ring.

(6) Fix the centering magnet by applying paint or the like (in 180° direction, at 2 points).

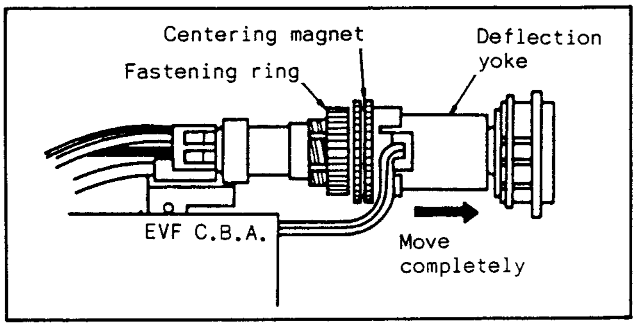


Fig. II-78

6-4 Brightness adjustment

SIGNAL	Self-recorded gray scale
MODE	PLAY
M. EQ.	EVF
ADJ.	EVF CBA VR2904
SPEC.	Distinguishable down to 11th step gray scale

6-5 Focus adjustment

MODE	Lens closed (character display)
M. EQ.	EVF
ADJ.	EVF CBA VR2903
SPEC.	EVF character under optimum focus

Note: Brightness and focus are adjustable without disassembly.

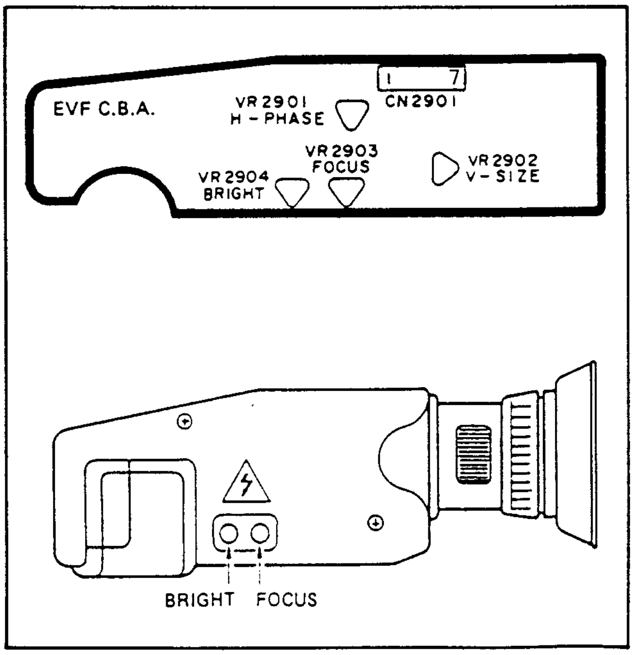


Fig. II-79

7. Mechanical Adjustment of Recorder Section

For mechanical adjustment of the recorder section, refer to the MC-4B service manual. The additional mechanical adjustment items only applied for A1 are explained here.

① Service mode (step 2)
(See Fig. II-80.)

Service mode (step 2) is set for tracking fine adjustment (4-3). However, there may be causes where waveform does not match 70% RF envelope output. In such cases, turn the VR201 (on SS C.B.A.) until the waveform is adjusted to 70% preliminarily.

Note: After tracking fine adjustment, readjust the ATF bias (P. II-31) and return the VR201 to the original position.

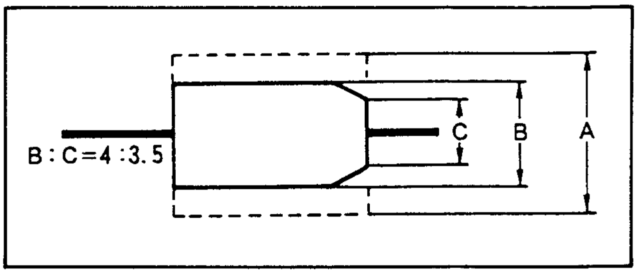


Fig. II-80

② Additional item for fine tracking adjustment in 4-3 (for Hi8)

Perform steps (1) through (4) in the same way.

Note: Then perform an additional adjustment peculiar to the Hi8 type as described in the following step (5).

(5) Slightly turn the guide No. 6 so that B : C = 4 : 3.5. (See Fig. II-80.)

CONTENTS

EXPLODED VIEWS

Casing Parts Section ………… Ⅲ－1
Lens / Camera Unit Section ………… Ⅲ－3
EVF / Recorder Parts Section ………… Ⅲ－5
Mechanical Chassis Section 1 ………… Ⅲ－7
Mechanical Chassis Section 2 ………… Ⅲ－9
Mechanical Chassis Section 3 ………… Ⅲ－11
Accessory Parts Section ………… Ⅲ－13

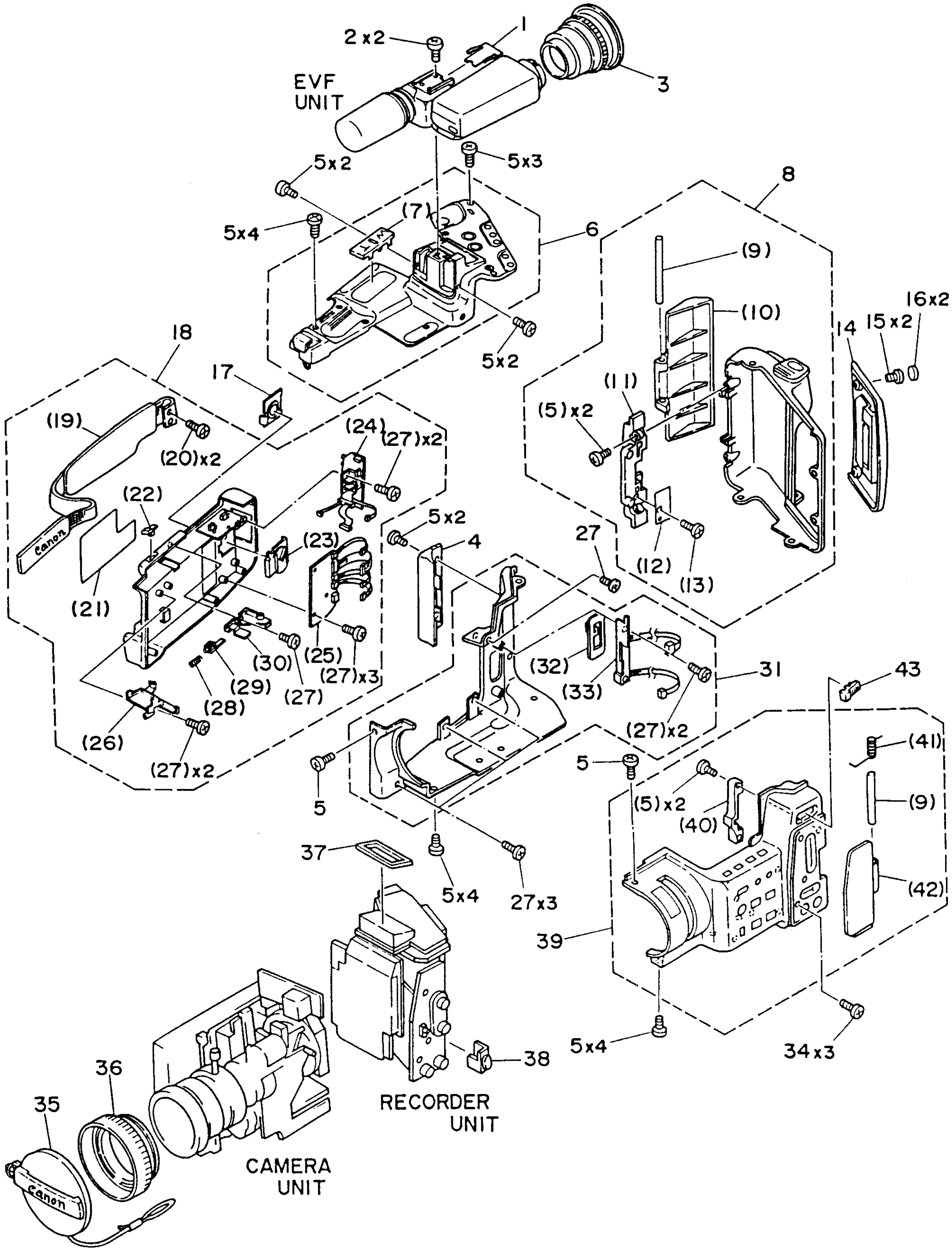
ELECTRICAL PARTS LIST ………… Ⅲ－15

PARTS LIST ………… Ⅲ－20

1. ESPECIALLY CRITICAL PARTS IN THE POWER CIRCUIT BLOCK SHOULD NOT BE REPLACED WITH OTHER MARKS.
   CRITICAL PARTS ARE MARKED WITH ⚠ IN THIS ELECTRICAL PARTS LIST.

2. THE NUMBERS INDICATED ON THE CONNECTORS DO NOT CORRESPOND TO THE SYMBOL NUMBERS.
   PLEASE CHECK THE CORRECT SYMBOL NUMBERS OF THE CONNECTORS ON THE INTERCONNECTION SCHEMATIC DIAGRAM.

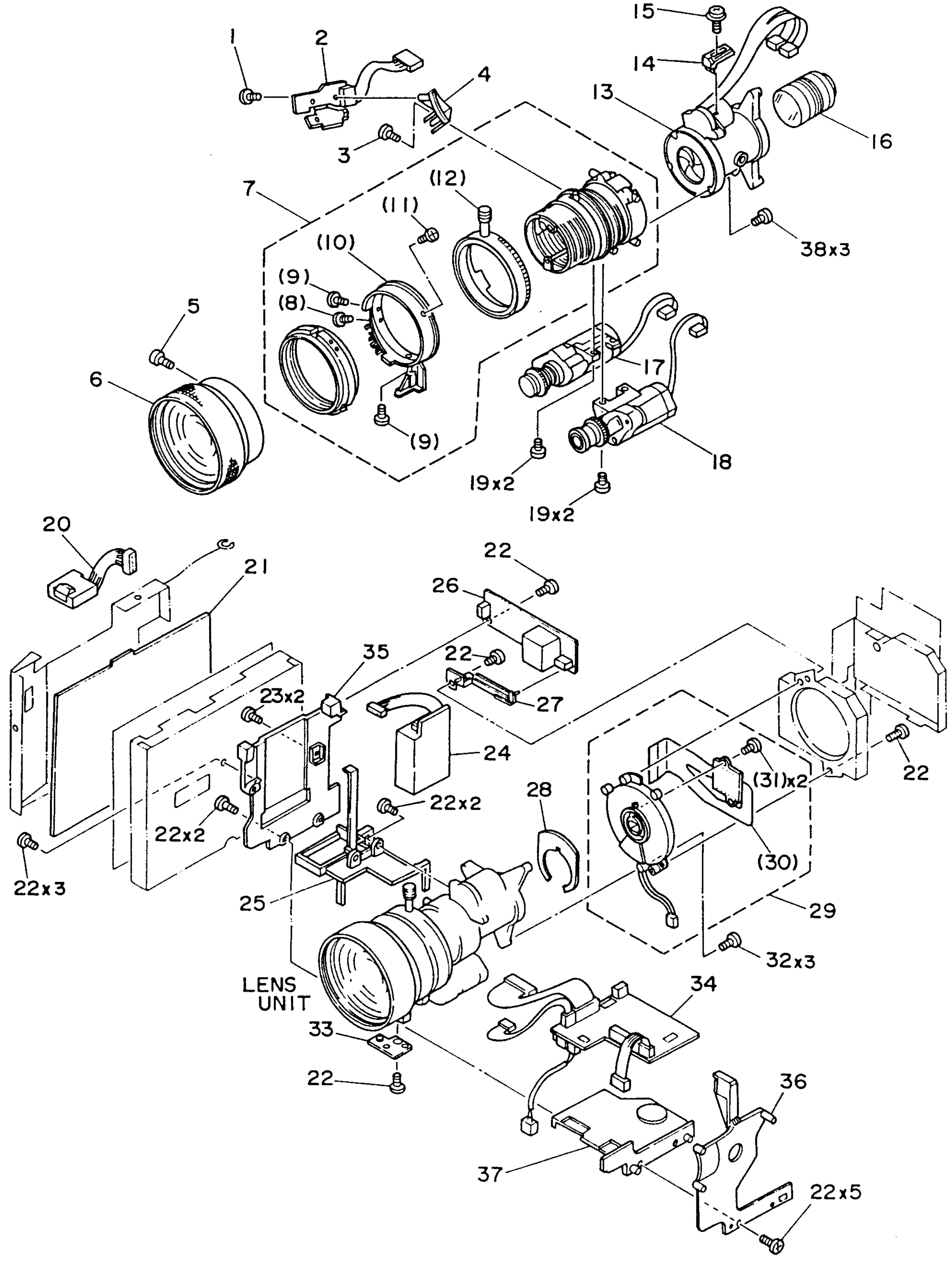
Casing Parts Section


2x2
1
3
EVF
UNIT
5x2
5x3
(7)
5x4
6
8
(9)
(10)
16x2
14
15x2
5x2
18
17
(11)
(5)x2
(19)
(24)
(27)x2
(20)x2
(22)
5x2
4
27
(23)
(12)
(13)
(21)
(32)
31
(30)
(25)
(27)x3
(33)
43
(29)
(27)
(28)
(27)x2
(26)
(41)
(27)x2
5
(5)x2
(9)
(40)
5
37
5x4
27x3
(42)
39
5x4
34x3
38
36
RECORDER
UNIT
35
CAMERA
UNIT

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DA1-1598-000 000	B	1	SPRING, ACCESSORY SHOE	
2	XA4-8200-709 000	F	2	SCREW, CROSS-RECESS, FCH	
3	DY2-6017-000 000	B	1	SPORTS FINDER SF-100	
4	DA1-2224-000 000	B	1	COVER (B), GRIP	
5	XA4-9200-509 000	F	27	SCREW, CROSS-RECESS, PH	
6	DY2-1134-000 000	B	1	TOP COVER ASS'Y	A1E ONLY
	DY2-1135-000 000	B	1	TOP COVER ASS'Y	A1F ONLY
7	DY2-1114-000 000	B	1	KNOB, TELE-WIDE	
8	DG9-0150-000 000	B	1	REAR COVER ASS'Y	A1E ONLY
	DG9-0151-000 000	B	1	REAR COVER ASS'Y	A1F ONLY
9	DA1-2211-000 000	C	2	SHAFT	
10	DA1-2207-000 000	B	1	COVER (A), GRIP	
11	DA1-2213-000 000	C	1	HOLDER, GRIP COVER (A)	
12	DA1-2221-000 000	C	1	SPRING, PLATE	
13	XA4-9200-359 000	F	1	SCREW, CROSS-RECESS, PH	
14	DF1-0485-000 000	B	1	COVER, CASSETTE	A1E ONLY
	DF1-0461-000 000	B	1	COVER, CASSETTE	A1F ONLY
15	XA1-7200-309 000	F	2	SCREW, CROSS-RECESS, PH	
16	DA1-2386-000 000	A	2	SEAL	
17	DA1-2183-000 000	C	1	COVER, BATTERY	
18	DY2-1113-000 000	B	1	GRIP COVER ASS'Y	
19	DA1-2284-000 000	B	1	STRAP, HAND	
20	X99-0619-000 000	F	2	SCREW, CROSS-RECESS	
21	DA1-2229-000 000	C	1	SEAL	
22	DA1-2232-000 000	C	1	KNOB, BATTERY	
23	DA1-2182-000 000	C	1	HOLDER, BATTERY	
24	DY1-1072-000 000	C	1	MIC JACK C.B.A.	
25	DG1-0811-000 000	C	1	BATTERY C.B.A.	
26	DA1-2225-000 000	C	1	HOLDER	
27	XA4-9200-609 000	F	14	SCREW, CROSS-RECESS, PH	
28	DS1-5182-000 000	C	1	SPRING, COIL	
29	DA1-2233-000 000	C	1	LEVER, BATTERY	
30	DA1-2234-000 000	C	1	HOOK, BATTERY	
31	DY2-1136-000 000	B	1	LEFT COVER ASS'Y	A1E ONLY
	DY2-1137-000 000	B	1	LEFT COVER ASS'Y	A1F ONLY
32	DA1-2184-000 000	C	1	KNOB, POWER	
33	DY1-1071-000 000	C	1	HEADPHONE JACK C.B.A.	
34	XA1-7200-509 000	F	3	SCREW, CROSS-RECESS, PH	
35	DF1-0464-000 000	B	1	CAP, LENS	
36	DA1-2235-000 000	B	1	HOOD, LENS	
37	DA1-2237-000 000	C	1	CUSHION, LCD	
38	DA1-2190-000 000	C	1	KNOB, EDIT	
39	DG9-0138-000 000	B	1	COVER, RIGHT	A1E ONLY
	DG9-0139-000 000	B	1	COVER, RIGHT	A1F ONLY
40	DA1-2214-000 000	C	1	HOLDER, JACK	
41	DS1-6067-000 000	C	1	SPRING, COIL	
42	DA1-2288-000 000	B	1	COVER, JACK	A1E ONLY
	DA1-2289-000 000	B	1	COVER, JACK	A1F ONLY
43	DA1-2189-000 000	C	1	KNOB, EJECT	

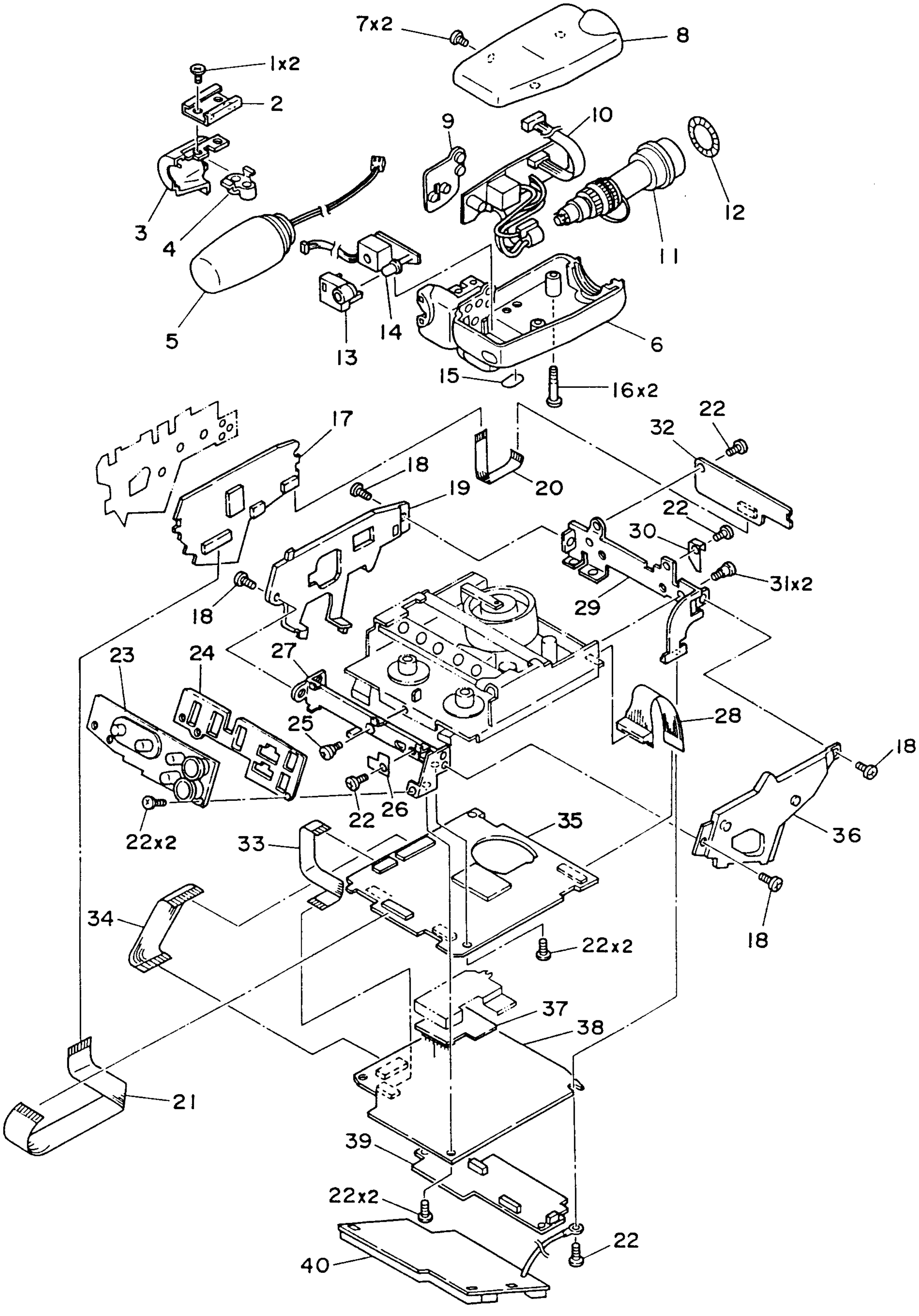
Lens/Camera Unit Section


1
2
3
4
5
6
7
(8)
(9)
(9)
(10)
(11)
(12)
13
14
15
16
17
18
19x2
19x2
20
21
22
22
22
22
22x2
22x2
22x3
22x5
23x2
24
25
26
27
28
29
(30)
(31)x2
32x3
33
34
35
36
37
38x3
LENS UNIT

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	XA4-4170-509 000	F	1	SCREW, CROSS-RECESS, PH	
2	DG9-3301-000 000	C	1	ENCODER C.B.A.	
3	XA4-4200-609 000	F	1	SCREW, CROSS-RECESS, PH	
4	DA7-1691-001 000	C	1	HOLDER, ENC. C.B.A.	
5	X91-1737-610 000	F	1	SCREW, CROSS-RECESS, PH	
6	DY1-7105-000 000	C	1	FOCUS LENS ASS'Y	
7	DY1-7107-000 000	C	1	ZOOM LENS ASS'Y	
8	XA4-4170-409 000	F	1	SCREW, CROSS-RECESS, PH	
9	X91-1737-300 000	F	2	SCREW, CROSS-RECESS, PH	
10	DY1-7106-000 000	C	1	RING, STOPPER	
11	X91-1727-090 000	F	1	SCREW, CROSS-RECESS, PH	
12	DG9-3406-000 000	C	1	ZOOM RING ASS'Y	
13	DH8-0033-001 000	C	1	IG METER	
14	DA7-1699-001 000	C	1	PLATE, ADJ.	
15	XB6-7260-609 000	F	1	SCREW, CROSS-RECESS, WH	
16	DG9-3300-000 000	C	1	RELAY LENS ASS'Y	
17	DH9-0294-001 000	C	1	AF MOTOR ASS'Y	
18	DH9-0295-001 000	C	1	PZ MOTOR ASS'Y	
19	XA4-4170-609 000	F	4	SCREW, CROSS-RECESS	
20	DG1-0642-000 000	C	1	WHITE BALANCE SENSOR	
21	DG1-0816-000 000	C	1	PROCESS C.B.A.	
22	XA4-9200-509 000	F	16	SCREW, CROSS-RECESS, PH	
23	XA1-7260-609 000	F	2	SCREW, CROSS-RECESS, PH	
24	DH3-0013-000 000	C	1	DC/DC CONVERTER	
25	DA1-2156-000 000	C	1	HOLDER, DC/DC CONVERTER	
26	DG1-0634-000 000	C	1	PIEZO DRIVE C.B.A.	
27	DA1-2157-000 000	C	1	HOLDER, PD C.B.A.	
28	DA1-2280-000 000	C	1	PLATE	
29	DY2-1139-000 000	C	1	ACTUATOR ASS'Y	
30	DH2-1032-000 000	C	1	PRINTED CORD	
31	XA9-0484-000 000	F	2	SCREW, CROSS-RECESS, FCH	
32	XA4-9201-009 000	F	3	SCREW, CROSS-RECESS, FCH	
33	DA1-2228-000 000	C	1	PLATE	
34	DG1-0817-000 000	C	1	AUTO FOCUS C.B.A.	
35	DA1-2254-000 000	C	1	HOLDER (2), CAMERA	
36	DA1-2283-000 000	C	1	HOLDER (3), CAMERA	
37	DA1-2151-000 000	C	1	HOLDER (1), CAMERA	
38	XA4-4200-909 000	F	3	SCREW, CROSS-RECESS	

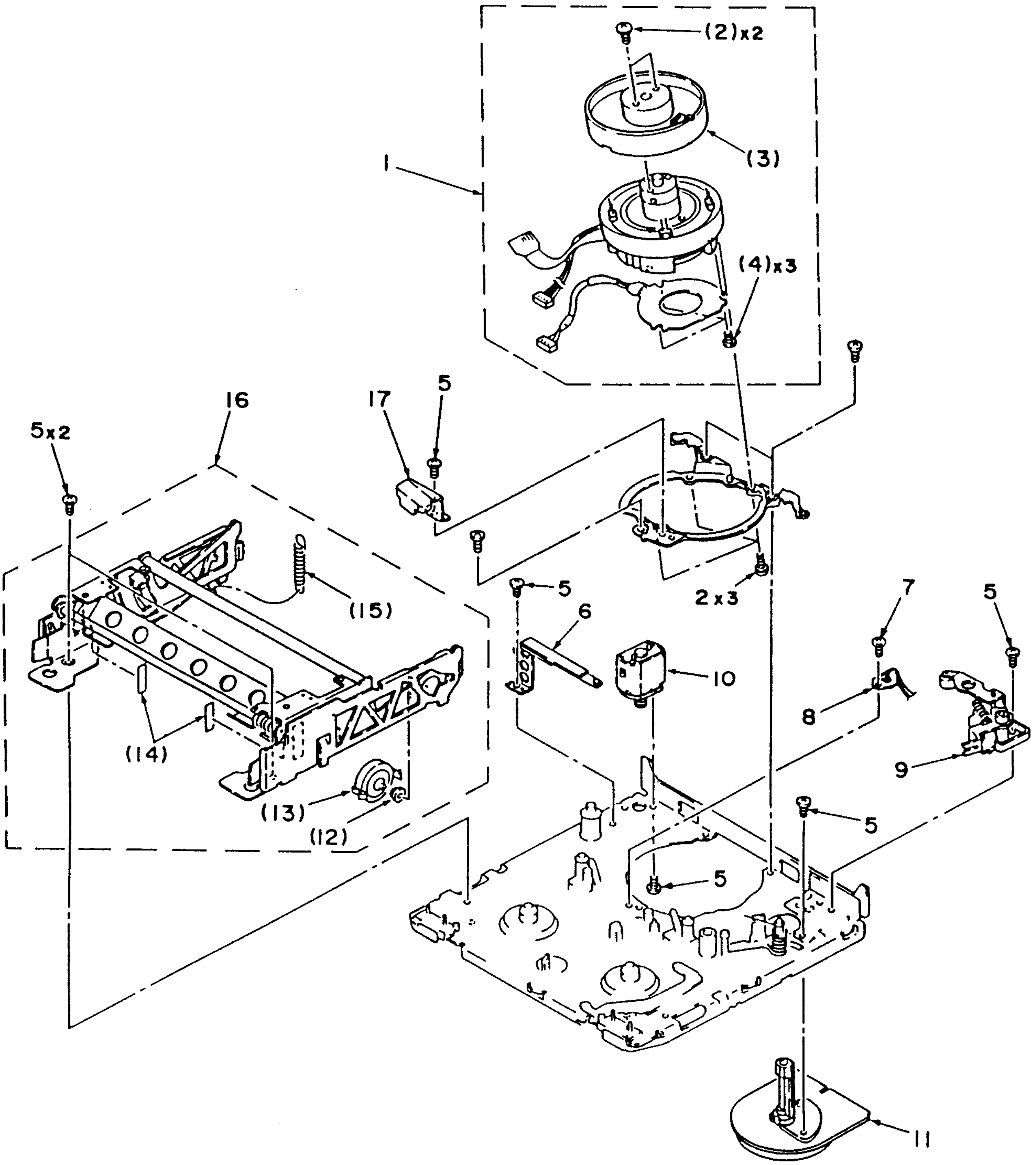
EVF/Recorder Parts Section


7x2
8
1x2
2
9
10
12
3
4
11
5
13
14
6
15
16x2
17
22
32
18
20
19
22
30
31x2
29
18
23
24
27
28
25
18
22
26
22x2
35
33
36
18
34
22x2
37
38
21
39
22x2
22
40

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	XA4-8200-609 000	F	2	SCREW, CROSS-RECESS, FCH	
2	DA1-1557-000 000	B	1	ACCESSORY, SHOE	
3	DA1-2162-000 000	B	1	SIDE COVER (B), E.V.F.	
4	DA1-2172-000 000	C	1	HOLDER, ACCESSORY SHOE	
5	DH9-0417-000 000	C	1	MICROPHONE	
6	DY1-1076-000 000	B	1	BOTTOM COVER, E.V.F.	
7	XA1-7200-259 000	F	2	SCREW, CROSS-RECESS, PH	
8	DY2-1116-000 000	B	1	TOP COVER, E.V.F.	
9	DA1-2171-000 000	C	1	SHEET, INSULATION	
10	DY1-1075-000 000	C	1	E.V.F. C.B.A.	
11	DY1-1073-000 000	C	1	CRT ASS'Y	
12	DA1-1864-000 000	B	1	RING, RUBBER	
13	DA1-2167-000 000	B	1	FILTER, INFRARED	
14	DY1-1074-000 000	C	1	REMOCON C.B.A.	
15	DA1-1677-000 000	B	1	PLATE, COVER	
16	X99-0617-000 000	F	2	SCREW, CROSS-RECESS	
17	DG1-0810-000 000	C	1	RECORDER KEY (1), C.B.A.	A1E ONLY
	DY1-1088-000 000	C	1	RECORDER KEY (1), C.B.A.	A1F ONLY
18	XA9-0484-000 000	F	4	SCREW, CROSS-RECESS, FCH	
19	DA1-2331-000 000	C	1	HOLDER (3), RECORDER	
20	DH2-1003-000 000	C	1	PRINTED CORD	
21	DH2-1004-000 000	C	1	PRINTED CORD	
22	XA1-7200-357 000	F	10	SCREW, CROSS-RECESS, PH	
23	DG1-0818-000 000	C	1	TERMINAL C.B.A.	
24	DF1-0488-000 000	C	1	PLATE, JACK	
25	DA1-1900-000 000	C	1	SCREW, CROSS-RECESS	
26	DA1-2349-000 000	C	1	PLATE, GROUND	
27	DA1-2333-000 000	C	1	HOLDER (1), RECORDER	
28	DF1-0444-000 000	C	1	PRINTED CORD	
29	DA1-2334-000 000	C	1	HOLDER (2), RECORDER	
30	DA1-2355-000 000	C	1	PLATE, GROUND	
31	DA1-1948-000 000	C	2	SCREW, CROSS-RECESS	
32	DG1-0792-000 000	C	1	RECORDER KEY (2), C.B.A.	
33	DH2-1001-000 000	C	1	PRINTED CORD	
34	DH2-1002-000 000	C	1	PRINTED CORD	
35	DG1-0809-000 000	C	1	SYSCON SERVO C.B.A.	
36	DA1-2332-000 000	C	1	HOLDER (4), RECORDER	
37	DG1-0623-000 000	C	1	HEAD AMP C.B.A.	
38	DG1-0744-003 000	C	1	VIDEO C.B.A.	
39	DG1-0746-000 000	C	1	CHROMA C.B.A.	
40	DG1-0812-000 000	C	1	AUDIO C.B.A.	

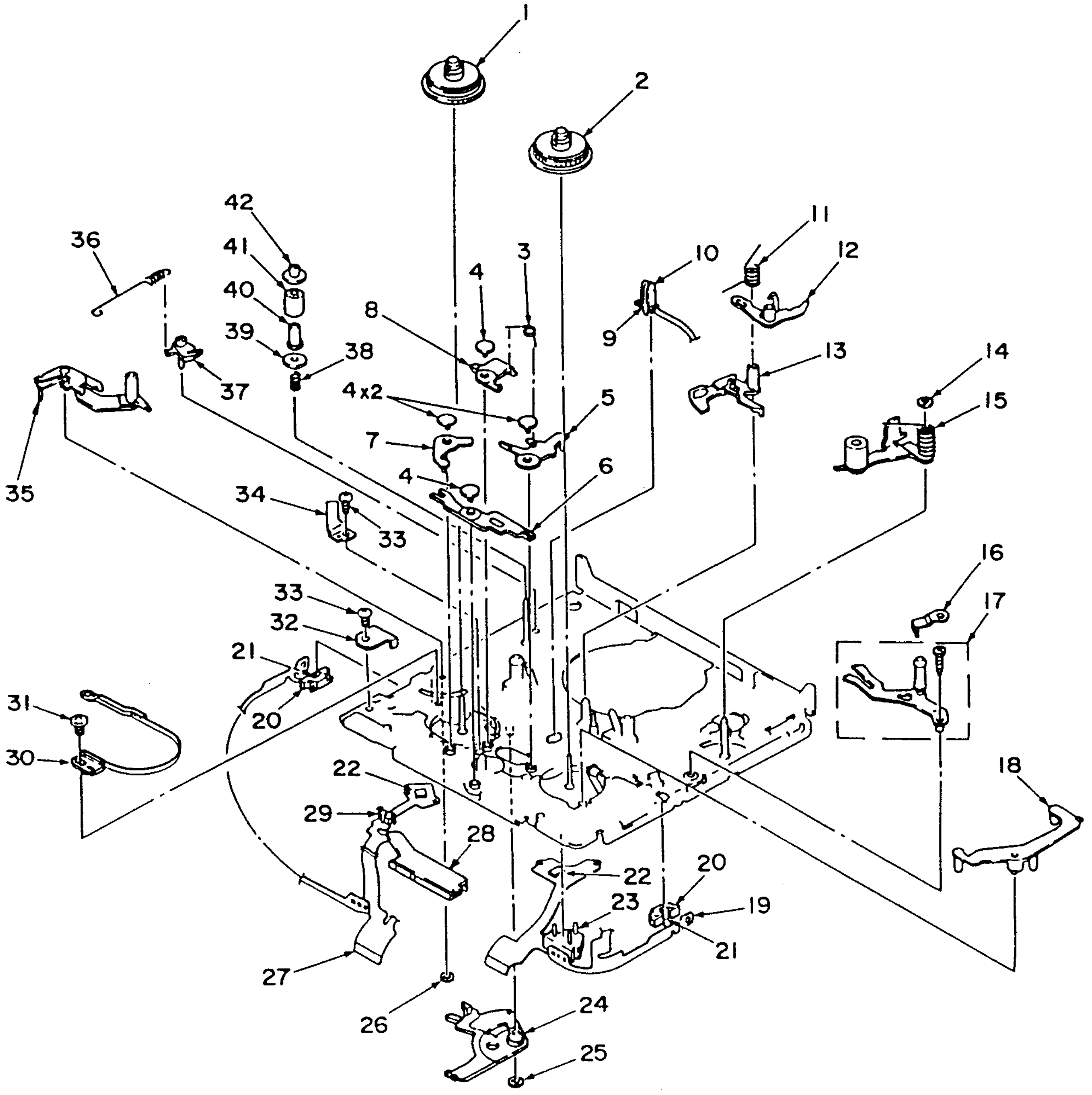
Mechanical Chassis Section I


(2)x2
(3)
1
(4)x3
16
17
5
5x2
(15)
5
2x3
6
7
5
10
8
9
(14)
(13)
(12)
5
5
11

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2738-000 000	E	1	DRUM ASS'Y	
2	DY4-2730-000 000	F	5	SCREW, CROSS-RECESS	
3	DY4-2739-000 000	E	1	UPPER DRUM ASS'Y	
4	DY4-2452-000 000	F	3	SCREW, CROSS-RECESS	
5	DY4-2727-000 000	F	7	SCREW, CROSS-RECESS	
6	DY4-2675-000 000	C	1	TERMINAL, EARTH	
7	DY4-2728-000 000	F	1	SCREW, CROSS-RECESS	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
9	DY4-2652-000 000	C	1	ROLLER ASS'Y	
10	DY4-2651-000 000	C	1	LOADING MOTOR ASS'Y	
11	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
12	DY4-2720-000 000	C	1	DAMPER, OIL	
13	DY4-2709-000 000	C	1	GEAR, DAMPER	
14	DY4-2729-000 000	C	2	TAPE	
15	DY4-2708-000 000	C	1	SPRING, COIL	
16	DY4-2673-000 000	C	1	CASSETTE COMPARTMENT ASS'Y	
17	DY4-2721-000 000	C	1	GUARD, GUIDE	

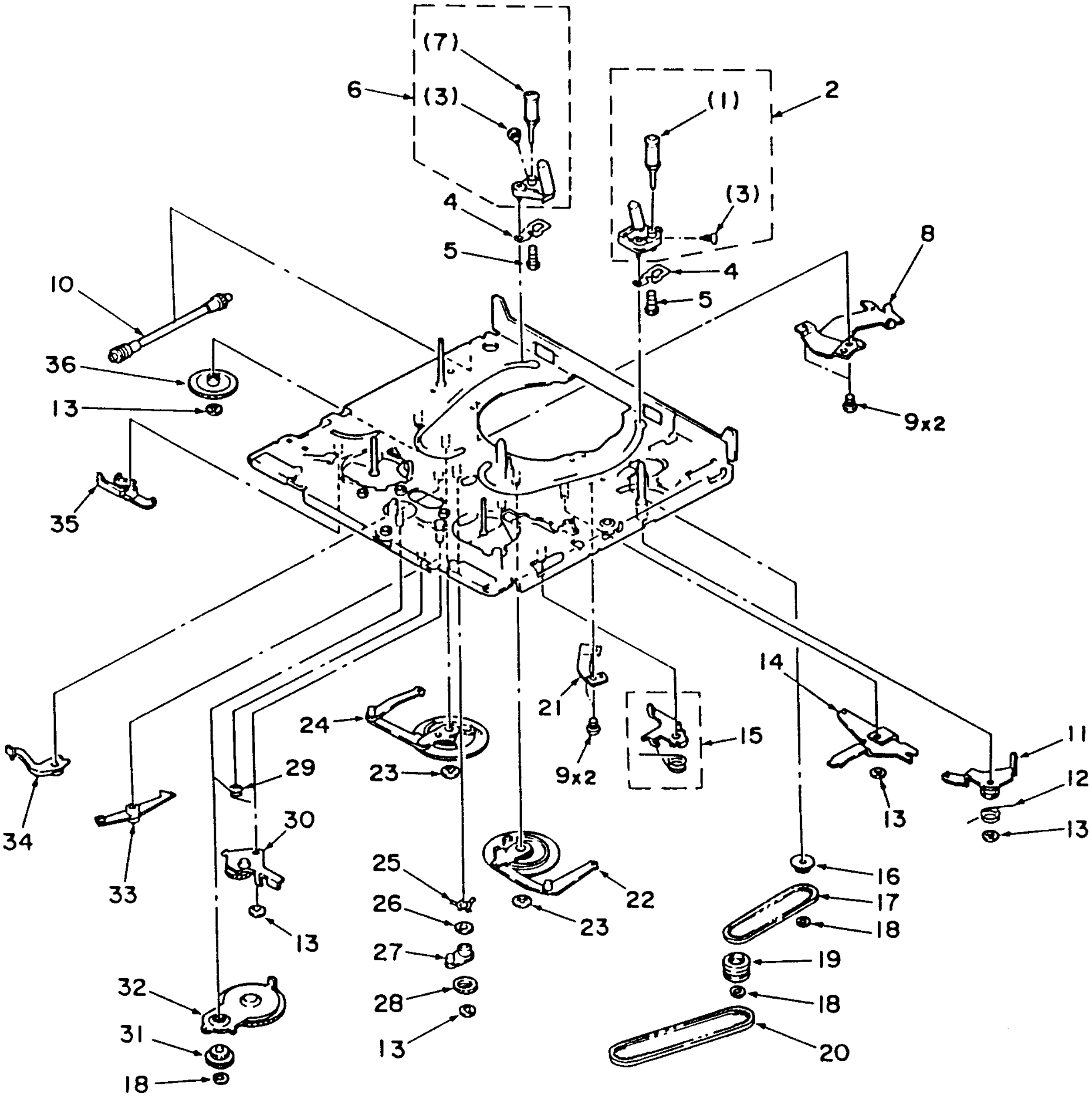
Mechanical Chassis Section 2


1
2
3
4
4x2
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
33
34
35
36
37
38
39
40
41
42
20
21
22

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2663-000 000	C	1	REEL, SUPPLY	
2	DY4-2666-000 000	C	1	REEL, TAKE UP	
3	DY4-2699-000 000	C	1	SPRING, COIL	
4	DY4-2696-000 000	C	4	PIN, SHAFT	
5	DY4-2714-000 000	C	1	BRAKE, T	
6	DY4-2692-000 000	C	1	LEVER, LB	
7	DY4-2691-000 000	C	1	BRAKE, LB	
8	DY4-2713-000 000	C	1	BRAKE, S	
9	DY4-2710-000 000	C	1	HOLDER, LED	
10	Y22-8012-000 000	B	1	LED GL452S	
11	DY4-2697-000 000	C	1	SPRING, COIL	
12	DY4-2716-000 000	C	1	ARM, STOPPER	
13	DY4-2723-000 000	C	1	STOPPER, RK	
14	DY4-2440-000 000	F	1	WASHER	
15	DY4-2653-000 000	C	1	ARM, PINCH	
16	DY4-2707-000 000	C	1	SPRING, PLATE	
17	DY4-2664-000 000	C	1	ARM, TG7	
18	DY4-2712-000 000	C	1	ARM, RELEASE	
19	DY4-2680-000 000	C	1	FLEXIBLE P.C.B. (2)	
20	DY4-2722-000 000	C	2	HOLDER, SENSOR	
21	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	
22	Y22-8121-000 000	B	2	SENSOR, PHOTO TLP907-0	
23	DY4-2678-000 000	C	1	SWITCH, PUSH	
24	DY4-2657-000 000	C	1	LEVER, SWITCH	
25	DY4-2688-000 000	F	1	WASHER	
26	DY4-2681-000 000	F	1	WASHER	
27	DY4-2679-000 000	C	1	FLEXIBLE P.C.B. (1)	
28	DY4-2677-000 000	C	1	SWITCH, SLIDE	
29	DY4-2676-000 000	C	1	SWITCH	
30	DY4-2660-000 000	C	1	BAND, TENSION	
31	DY4-2727-000 000	F	1	SCREW, CROSS-RECESS	
32	DY4-2725-000 000	C	1	PLATE, SWITCH	
33	DY4-2728-000 000	F	2	SCREW, CROSS-RECESS	
34	DY4-2690-000 000	C	1	PLATE, TL	
35	DY4-2669-000 000	C	1	ARM	
36	DY4-2724-000 000	C	1	SPRING, COIL	
37	DY4-2717-000 000	C	1	ARM, ADJUST	
38	DY4-2705-000 000	C	1	SPRING, COIL	
39	DY4-2701-000 000	C	1	FLANGE, TG2	
40	DY4-2704-000 000	C	1	SLEEVE, TG2	
41	DY4-2702-000 000	C	1	ROLLER, TG2	
42	DY4-2703-000 000	C	1	FLANGE, TG2	

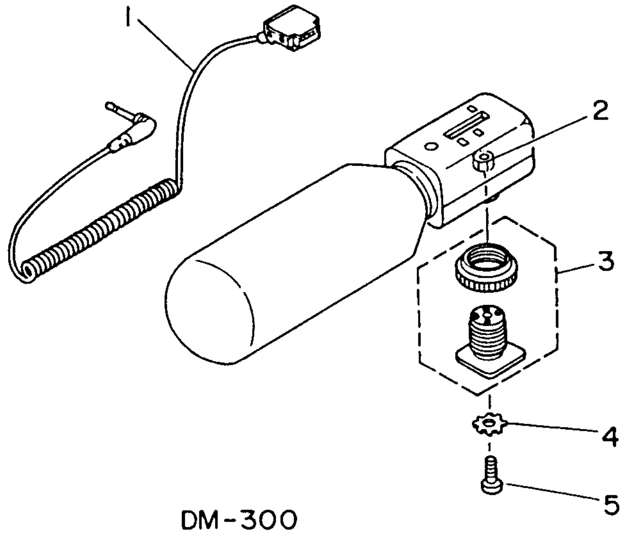
Mechanical Chassis Section 3


(7)
6
(3)
2
(1)
(3)
4
5
4
5
8
10
36
13
9x2
35
14
21
15
9x2
11
12
13
13
24
23
29
34
33
30
13
25
26
27
28
13
22
23
16
17
18
19
18
20
32
31
18

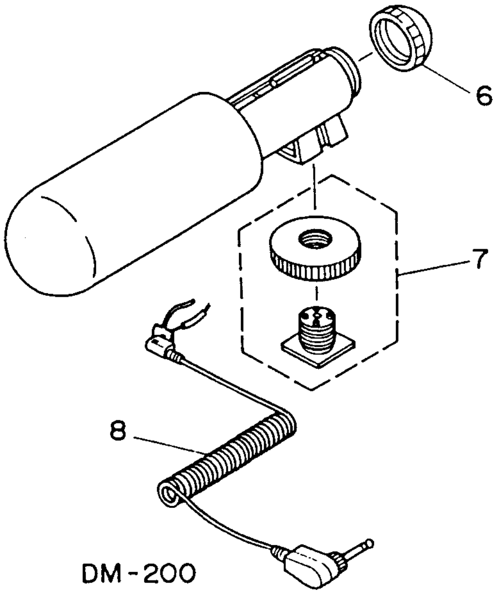
MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2674-000 000	C	1	ROLLER, GUIDE	
2	DY4-2649-000 000	C	1	COASTER, RIGHT	
3	DY4-2686-000 000	F	2	SCREW, CROSS-RECESS	
4	DY4-2685-000 000	C	2	SPRING, LEAF	
5	DY4-2689-000 000	F	2	SCREW, CROSS-RECESS	
6	DY4-2648-000 000	C	1	COASTER, LEFT	
7	DY4-2662-000 000	C	1	ROLLER, GUIDE	
8	DY4-2672-000 000	C	1	PLATE, SS	
9	DY4-2728-000 000	F	4	SCREW, CROSS-RECESS	
10	DY4-2658-000 000	C	1	WORM ASS'Y	
11	DY4-2665-000 000	C	1	ARM, PINCH SUB	
12	DY4-2706-000 000	C	1	SPRING, COIL	
13	DY4-2688-000 000	F	5	WASHER	
14	DY4-2655-000 000	C	1	LEVER, THREADING	
15	DY4-2659-000 000	C	1	BRAKE, TS	
16	DY4-2656-000 000	C	1	GEAR, JOINT	
17	DY4-2719-000 000	E	1	BELT (S), TIMING	
18	DY4-2681-000 000	F	3	WASHER	
19	DY4-2671-000 000	C	1	PULLEY, RELAY	
20	DY4-2718-000 000	E	1	BELT (L), TIMING	
21	DY4-2684-000 000	C	1	PLATE, TT	
22	DY4-2668-000 000	C	1	GEAR	
23	DY4-2440-000 000	F	2	WASHER	
24	DY4-2667-000 000	C	1	GEAR	
25	DY4-2700-000 000	C	1	SPRING	
26	DY4-2527-000 000	F	1	WASHER	
27	DY4-2695-000 000	C	1	ARM, UL	
28	DY4-2694-000 000	C	1	GEAR, UL	
29	DY4-2698-000 000	C	1	SPRING, COIL	
30	DY4-2650-000 000	C	1	GEAR ASS'Y	
31	DY4-2661-000 000	C	1	GEAR	
32	DY4-2654-000 000	C	1	GEAR ASS'Y	
33	DY4-2693-000 000	C	1	ARM, RELEASE	
34	DY4-2715-000 000	C	1	BRAKE, UL	
35	DY4-2711-000 000	C	1	LEVER, EJECT	
36	DY4-2687-000 000	C	1	GEAR, WHEEL	

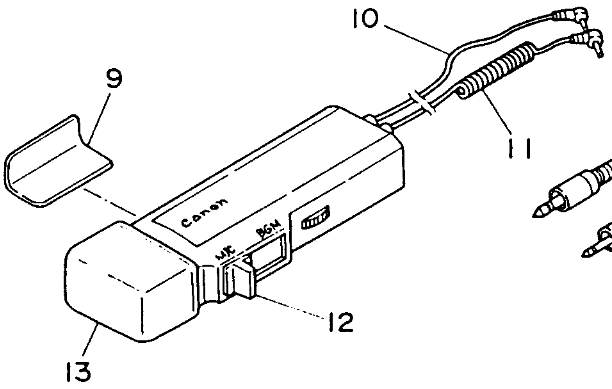
Accessory Parts Section



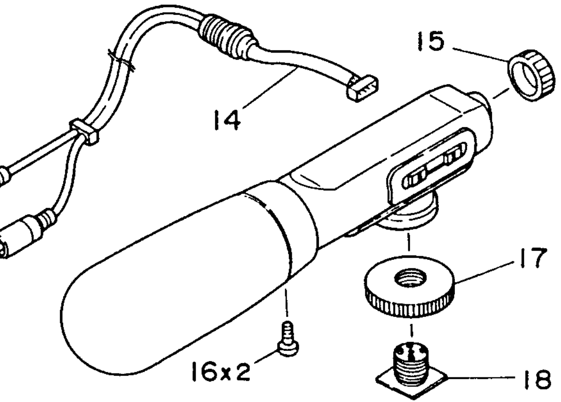
DM-300



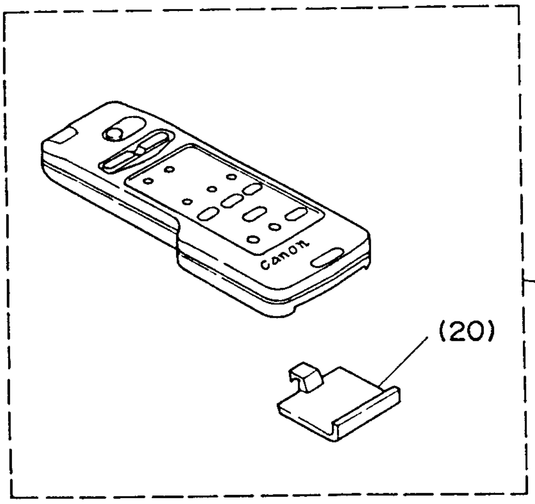
DM-200


10
9
11
Canon
MIC
BGM
12
13

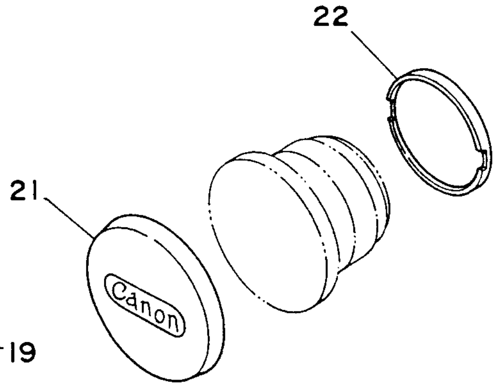
MM-100


15
14
17
16x2
18

MM-200



WL-100



WD-55, TL-55

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY5-1467-000 000	C	1	CORD, BATTERY	
2	DY5-1468-000 000	C	1	NUT	
3	DY5-1469-000 000	C	1	SHOE ASS'Y	
4	DY5-1470-000 000	C	1	WASHER	
5	DY5-1471-000 000	C	1	SCREW, CROSS-RECESS	
6	DY5-1459-000 000	C	1	BATTERY COMPARTMENT	
7	DY5-1460-000 000	C	1	SHOE ASS'Y	
8	DY5-1461-000 000	C	1	CORD ASS'Y	
9	DA8-0178-000 000	B	1	COVER, BATTERY	
10	DH2-0812-000 000	C	1	CABLE, INPUT	
11	DH2-0813-000 000	C	1	CABLE, OUTPUT	
12	DA8-0177-000 000	B	1	KNOB, MIXING	
13	DA8-0181-000 000	B	1	WINDSCREEN	
14	DH2-1072-000 000	C	1	CORD ASS'Y	
15	DA8-0194-000 000	B	1	KNOB	
16	XB4-6201-609 000	F	2	SCREW, CROSS-RECESS	
17	CA4-4292-000 000	C	1	RING	
18	DA8-0188-000 000	C	1	SHOE	
19	DY2-6018-000 000	B	1	WIRELESS CONTROLLER WL-100	A1E ONLY
	DY2-6020-000 000	B	1	WIRELESS CONTROLLER WL-100F	A1F ONLY
20	DY3-4197-000 000	B	1	COVER, BATTERY	
21	DA7-1769-000 000	C	1	CAP, LENS	
22	DA7-1770-000 000	C	1	CAP, DUST	

ELECTRICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
⚠	C2915	VC5-2970-106 000	C	1	CAPACITOR, ELECT. 10μF/16V	
⚠	C2916	VC5-9850-472 000	C	1	CAPACITOR, FILM 4700pF/100V	
⚠	C2918	VC5-9520-102 000	C	1	CAPACITOR, CERA. 1000pF/1KV	
⚠	C2920	VC6-1570-152 000	C	1	CAPACITOR, CERA. 1500pF/500V	
	CN001	VS1-0875-016 000	C	1	CONNECTOR 16P	
	CN002	VS1-0875-008 000	C	1	CONNECTOR 8P	
	CN104	VS1-0875-020 000	C	1	CONNECTOR 20P	
	CN105	VS1-0875-010 000	C	1	CONNECTOR 10P	
	CN106	VS1-0875-013 000	C	1	CONNECTOR 13P	
	CN107	VS1-0875-016 000	C	1	CONNECTOR 16P	
	CN108	VS1-0875-011 001	C	1	CONNECTOR 11P	
	CN203	VS1-0875-015 000	C	1	CONNECTOR 15P	
	CN301	VS1-0875-010 000	C	1	CONNECTOR 10P	
	CN302	VS1-0875-020 000	C	1	CONNECTOR 20P	
	CN1001	VS1-0875-008 000	C	1	CONNECTOR 8P	
	CN2102	VS1-0876-020 000	C	1	CONNECTOR 20P	
	D001	WA1-0961-000 000	B	1	DIODE MA112	
	D002	WA1-0961-000 000	B	1	DIODE MA112	
	D003	WA1-0961-000 000	B	1	DIODE MA112	
	D004	WA1-0547-000 201	B	1	DIODE 1SS184	
	D005	WA1-0961-000 000	B	1	DIODE MA112	
	D006	WA1-0961-000 000	B	1	DIODE MA112	
	D007	WA1-0962-000 000	B	1	DIODE MA121	
	D008	WA1-1146-000 000	B	1	DIODE MA707	
	D009	WA1-0961-000 000	B	1	DIODE MA112	
	D101	WA1-0962-000 000	B	1	DIODE MA121	
	D102	WA1-0961-000 000	B	1	DIODE MA112	
	D103	WA1-0547-000 201	B	1	DIODE 1SS184	
	D104	WA1-0384-000 000	B	1	ZENER DIODE RD5.6MB2	
	D105	WA1-0961-000 000	B	1	DIODE MA112	
	D106	WA1-0961-000 000	B	1	DIODE MA112	
	D107	WA1-0961-000 000	B	1	DIODE MA112	
	D201	WA1-0612-000 201	B	1	DIODE E10QS03	
	D202	WA1-0612-000 201	B	1	DIODE E10QS03	
	D303	WA1-0547-000 201	B	1	DIODE 1SS184	
	D304	WA1-0961-000 000	B	1	DIODE MA112	
	D306	WA1-0961-000 000	B	1	DIODE MA112	
	D307	WA1-0953-000 000	B	1	DIODE MA716	
	D310	WA1-0961-000 000	B	1	DIODE MA112	
	D314	WA1-0547-000 201	B	1	DIODE 1SS184	
	D2101	WA1-0961-000 000	B	1	DIODE MA112	
	D2102	WA1-0985-000 000	B	1	DIODE MA341	
	D2103	WA1-0961-000 000	B	1	DIODE MA112	
	D2104	WA1-0962-000 000	B	1	DIODE MA121	
	D2105	WA1-0962-000 000	B	1	DIODE MA121	
	D2106	WA1-0961-000 000	B	1	DIODE MA112	
	D2107	WA1-0380-000 000	B	1	DIODE MA157	
	D2108	WA1-0962-000 000	B	1	DIODE MA121	
	D2109	WA1-0961-000 000	B	1	DIODE MA112	
	D2201	WA1-0961-000 000	B	1	DIODE MA112	
	D2202	WA1-0961-000 000	B	1	DIODE MA112	
	D2301	WA1-0380-000 000	B	1	DIODE MA157	
	D2302	WA1-0961-000 000	B	1	DIODE MA112	
	D2304	WA1-0961-000 000	B	1	DIODE MA112	
	D2401	WA1-0696-000 201	B	1	DIODE MA152WA	
	D2402	WA1-0961-000 000	B	1	DIODE MA112	
	D2901	WA1-0989-000 000	B	1	DIODE MA3100W	
	D2902	WA1-0961-000 000	B	1	DIODE MA112	
	D2903	WA1-0961-000 000	B	1	DIODE MA112	
	D2904	WA1-1123-000 000	B	1	DIODE AG01Z	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
D2905	WA1-1124-000 000	B	1	DIODE SHV02	
IC001	DH4-0203-000 000	B	1	IC µPD75308GF	
IC002	WA4-0311-000 000	B	1	IC NJM2903M	
IC101	DH4-0194-000 000	B	1	IC CXP80116	
IC102	DH4-0213-000 000	B	1	IC µPD7564G	
IC103	DH4-0205-000 000	B	1	IC LVC556	
IC104	WA4-0905-000 000	B	1	IC TA7733F	
IC105	WA4-1167-000 000	B	1	IC RH5RA50AA	
IC106	WA4-1145-000 000	B	1	IC RH5VA45AA	
IC201	DH4-0029-000 000	B	1	IC CX20114	
IC202	DH4-0030-000 000	B	1	IC CX20115	
IC203	DH4-0189-000 000	B	1	IC CXA1127M	
IC204	DH4-0135-000 000	B	1	IC CXA1204Q	
IC303	DH4-0205-000 000	B	1	IC LVC556	
IC304	DH4-0197-000 000	B	1	IC CXA1230AR	
IC306	DH4-0198-000 000	B	1	IC CXA1231AR	
IC307	DH4-0155-000 000	B	1	IC µPD6145G-101	
IC308	DH4-0223-000 000	B	1	IC µPD6144AG-601	
IC309	WA4-1292-000 000	B	1	IC LVA522	
IC310	WA3-4018-000 000	B	1	IC TC7SU04F	
IC311	DH4-0225-000 000	B	1	IC MM1002	
IC2101	DH4-0244-000 000	B	1	IC MN5138	
IC2102	DH4-0125-000 000	B	1	IC MN53015CXY	
IC2103	WA3-3900-000 000	B	1	IC µPD6147G	
IC2104	WA4-0901-000 000	B	1	IC AN2011S	
IC2105	DH4-0230-000 000	B	1	IC MN3824S	
IC2106	DH4-0231-000 000	B	1	IC MN3823S	
IC2201	WA4-0349-000 201	B	1	IC NJM2904M	
IC2202	WA4-0349-000 201	B	1	IC NJM2904M	
IC2203	WA4-1075-000 000	B	1	IC AN2153NS	
IC2301	WA4-0264-000 201	B	1	IC NJM2902M	
IC2302	WA4-1076-000 000	B	1	IC AN2253FAP	
IC2401	WA4-1167-000 000	B	1	IC RH5RA50AA	
IC2402	WA3-4010-000 000	B	1	IC S-2940IF	
IC2403	DH4-0185-000 000	B	1	IC M37450M4	
IC2404	WA4-1145-000 000	B	1	IC RH5VA45AA	
IC2405	WA4-0458-000 000	B	1	IC NJM3414M	
IC2407	WA4-0264-000 201	B	1	IC NJM2902M	
IC2901	WA4-0511-000 000	B	1	IC AN2510S	
IC2931	DH4-0205-000 000	B	1	IC LVC556	
⚠ L2902	DH9-0392-000 000	C	1	COIL 240µH	
LCD001	DH9-0406-000 000	C	1	LIQUID CRYSTAL DISPLAY	
LED001	WG1-0427-000 000	B	1	LED LT1D51A	
Q001	WA2-1235-000 000	B	1	TRANSISTOR IMB6	
Q002	WA2-1235-000 000	B	1	TRANSISTOR IMB6	
Q003	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q004	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q005	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
Q006	WA2-0760-000 000	B	1	TRANSISTOR DTC114TK	
Q007	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q101	WA2-1437-000 000	B	1	TRANSISTOR 2SB1121 (S,T)	
Q102	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q103	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q104	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q105	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q106	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q107	WA2-0760-000 000	B	1	TRANSISTOR DTC114TK	
Q108	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q109	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q110	WA2-1248-000 000	B	1	TRANSISTOR DTA124EK	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q111	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q112	WA2-1099-000 000	B	1	TRANSISTOR FMW1	
Q113	WA2-1099-000 000	B	1	TRANSISTOR FMW1	
Q114	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q115	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q116	WA2-1437-000 000	B	1	TRANSISTOR 2SB1121 (S,T)	
Q117	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q118	WA2-1437-000 000	B	1	TRANSISTOR 2SB1121 (S,T)	
Q119	WA2-1437-000 000	B	1	TRANSISTOR 2SB1121 (S,T)	
Q121	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q122	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q201	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q203	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q204	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q205	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q206	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q207	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q208	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q210	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q301	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q313	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q315	WA2-0735-000 000	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q316	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q317	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q318	WA2-1436-000 000	B	1	TRANSISTOR 2SB962-Z	
Q319	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
Q320	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q321	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q322	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q323	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q325	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q327	WA2-1089-000 000	B	1	TRANSISTOR DTC124EK	
Q330	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q334	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q335	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q339	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q340	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q341	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q342	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q344	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q348	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q350	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q352	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q354	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q355	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q356	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q357	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q361	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q362	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
Q371	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q372	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q378	WA2-1248-000 000	B	1	TRANSISTOR DTA124EK	
Q383	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
Q385	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q387	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q388	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q389	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2051	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2052	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q2053	WA2-1201-000 000	B	1	TRANSISTOR IMZ2	

ELECTRICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	Q2101	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
	Q2102	WA2-1501-000 000	B	1	TRANSISTOR 2SK198	
	Q2103	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
	Q2104	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
	Q2105	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
	Q2106	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
	Q2107	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
	Q2108	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
	Q2109	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
	Q2110	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
	Q2111	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2112	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2113	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2114	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
	Q2201	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
	Q2202	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2203	WA2-1098-000 000	B	1	TRANSISTOR FMS1	
	Q2204	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2205	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
	Q2206	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2207	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2208	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2209	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2210	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
	Q2211	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
	Q2212	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2213	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2214	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
	Q2215	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712 (GR,BL)	
	Q2216	WA2-1501-000 000	B	1	TRANSISTOR 2SK198	
	Q2217	WA2-1501-000 000	B	1	TRANSISTOR 2SK198	
	Q2218	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
	Q2302	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
	Q2303	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
	Q2304	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
	Q2305	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2306	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
	Q2307	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
	Q2308	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2309	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2311	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
	Q2312	WA2-1099-000 000	B	1	TRANSISTOR FMW1	
	Q2401	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
	Q2901	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
	Q2902	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
	Q2903	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162 (GR/Y)	
	Q2904	WA2-0481-000 000	B	1	TRANSISTOR 2SD968A	
	Q2931	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
	Q2932	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213 (Y)	
⚠	RR101	DH4-0144-000 000	D	1	LINK, IC ICP-F25	
⚠	RR201	DH4-0144-000 000	D	1	LINK, IC ICP-F25	
⚠	RR301	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠	RR1101	DH4-0166-000 000	D	1	LINK, IC D2000	
⚠	RR1102	DH4-0166-000 000	D	1	LINK, IC D2000	
⚠	RR2901	DH4-0141-000 000	D	1	LINK, IC ICP-N15	
⚠	T2901	DH9-0437-000 000	C	1	FLYBACK TRANSFORMER	
	VC301	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
	VC551	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
	VC2101	VC6-0340-100 000	C	1	CAPACITOR, TRIMMER 10pF	
	VC2102	VC6-0340-100 000	C	1	CAPACITOR, TRIMMER 10pF	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
VC2103	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VC2601	VC6-0340-200 000	C	1	CAPACITOR, TRIMMER 20pF	
VC2602	VC6-3670-200 000	C	1	CAPACITOR, TRIMMER 20pF	
VL301	DH6-0250-000 000	C	1	INDUCTOR, VARIABLE	
VL551	DH6-0245-000 000	C	1	INDUCTOR, VARIABLE	
VR101	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR102	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR103	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR104	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
VR105	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR201	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR304	VR5-7780-471 000	C	1	RESISTOR, VARIABLE 470Ω	
VR305	VR5-7780-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
VR306	VR5-7780-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
VR307	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR308	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR309	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR310	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR311	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR312	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR313	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR315	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR316	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR551	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR552	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR553	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
VR554	VR5-7780-224 000	C	1	RESISTOR, VARIABLE 220KΩ	
VR2051	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2101	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2201	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2202	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2203	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR2204	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR2206	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR2207	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2301	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2302	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2303	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2304	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2401	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2402	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2601	VR5-5320-502 000	C	1	RESISTOR, VARIABLE 5KΩ	
VR2602	VR5-5320-104 000	C	1	RESISTOR, VARIABLE 100KΩ	
VR2901	VR5-3690-502 000	C	1	RESISTOR, VARIABLE 5KΩ	
VR2902	VR5-3690-201 000	C	1	RESISTOR, VARIABLE 200Ω	
⚠ VR2903	VR5-4710-205 000	C	1	RESISTOR, VARIABLE 2MΩ	
VR2904	VR5-4710-504 000	C	1	RESISTOR, VARIABLE 500KΩ	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
14	CA4-4292-000 000	C	1	RING	
6	DA1-1557-000 000	B	1	ACCESSORY, SHOE	
2	DA1-1598-000 000	B	1	SPRING, ACCESSORY SHOE	
6	DA1-1677-000 000	B	1	PLATE, COVER	
6	DA1-1864-000 000	B	1	RING, RUBBER	
6	DA1-1900-000 000	C	1	SCREW, CROSS-RECESS	
6	DA1-1948-000 000	C	2	SCREW, CROSS-RECESS	
4	DA1-2151-000 000	C	1	HOLDER (1), CAMERA	
4	DA1-2156-000 000	C	1	HOLDER, DC/DC CONVERTER	
4	DA1-2157-000 000	C	1	HOLDER, PD C.B.A.	
6	DA1-2162-000 000	B	1	SIDE COVER (B), E.V.F.	
6	DA1-2167-000 000	B	1	FILTER, INFRARED	
6	DA1-2171-000 000	C	1	SHEFT, INSULATION	
6	DA1-2172-000 000	C	1	HOLDER, ACCESSORY SHOE	
2	DA1-2182-000 000	C	1	HOLDER, BATTERY	
2	DA1-2183-000 000	C	1	COVER, BATTERY	
2	DA1-2184-000 000	C	1	KNOB, POWER	
2	DA1-2189-000 000	C	1	KNOB, EJECT	
2	DA1-2190-000 000	C	1	KNOB, EDIT	
2	DA1-2207-000 000	B	1	COVER (A), GRIP	
2	DA1-2211-000 000	C	2	SHAFT	
2	DA1-2213-000 000	C	1	HOLDER, GRIP COVER (A)	
2	DA1-2214-000 000	C	1	HOLDER, JACK	
2	DA1-2221-000 000	C	1	SPRING, PLATE	
2	DA1-2224-000 000	B	1	COVER (B), GRIP	
2	DA1-2225-000 000	C	1	HOLDER	
4	DA1-2228-000 000	C	1	PLATE	
2	DA1-2229-000 000	C	1	SEAL	
2	DA1-2232-000 000	C	1	KNOB, BATTERY	
2	DA1-2233-000 000	C	1	LEVER, BATTERY	
2	DA1-2234-000 000	C	1	HOOK, BATTERY	
2	DA1-2235-000 000	B	1	HOOD, LENS	
2	DA1-2237-000 000	C	1	CUSHION, LCD	
4	DA1-2254-000 000	C	1	HOLDER (2), CAMERA	
4	DA1-2280-000 000	C	1	PLATE	
4	DA1-2283-000 000	C	1	HOLDER (3), CAMERA	
2	DA1-2284-000 000	B	1	STRAP, HAND	
2	DA1-2288-000 000	B	1	COVER, JACK	A1E ONLY
2	DA1-2289-000 000	B	1	COVER, JACK	A1F ONLY
6	DA1-2331-000 000	C	1	HOLDER (3), RECORDER	
6	DA1-2332-000 000	C	1	HOLDER (4), RECORDER	
6	DA1-2333-000 000	C	1	HOLDER (1), RECORDER	
6	DA1-2334-000 000	C	1	HOLDER (2), RECORDER	
6	DA1-2349-000 000	C	1	PLATE, GROUND	
6	DA1-2355-000 000	C	1	PLATE, GROUND	
2	DA1-2386-000 000	A	2	SEAL	
4	DA7-1691-001 000	C	1	HOLDER, ENC. C.B.A.	
4	DA7-1699-001 000	C	1	PLATE, ADJ.	
14	DA7-1770-000 000	C	1	CAP, DUST	
14	DA7-1769-000 000	C	1	CAP, LENS	
14	DA8-0177-000 000	B	1	KNOB, MIXING	
14	DA8-0178-000 000	B	1	COVER, BATTERY	
14	DA8-0181-000 000	B	1	WINDSCREEN	
14	DA8-0188-000 000	C	1	SHOE	
14	DA8-0194-000 000	B	1	KNOB	
6	DF1-0444-000 000	C	1	PRINTED CORD	
2	DF1-0461-000 000	B	1	COVER, CASSETE	A1F ONLY
2	DF1-0464-000 000	B	1	CAP, LENS	
2	DF1-0485-000 000	B	1	COVER, CASSETTE	A1E ONLY
6	DF1-0488-000 000	C	1	PLATE, JACK	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	6	DG1-0623-000 000	C	1	HEAD AMP C.B.A.	
	4	DG1-0634-000 000	C	1	PIEZO DRIVE C.B.A.	
	4	DG1-0642-000 000	C	1	WHITE BALANCE SENSOR	
	6	DG1-0744-003 000	C	1	VIDEO C.B.A.	
	6	DG1-0746-000 000	C	1	CHROMA C.B.A.	
	6	DG1-0792-000 000	C	1	RECORDER KEY (2), C.B.A.	
	6	DG1-0809-000 000	C	1	SYSCON SERVO C.B.A.	
	6	DG1-0810-000 000	C	1	RECORDER KEY (1), C.B.A.	A1E ONLY
	2	DG1-0811-000 000	C	1	BATTERY C.B.A.	
	6	DG1-0812-000 000	C	1	AUDIO C.B.A.	
	4	DG1-0816-000 000	C	1	PROCESS C.B.A.	
	4	DG1-0817-000 000	C	1	AUTO FOCUS C.B.A.	
	6	DG1-0818-000 000	C	1	TERMINAL C.B.A.	
	2	DG9-0138-000 000	B	1	COVER, RIGHT	A1E ONLY
	2	DG9-0139-000 000	B	1	COVER, RIGHT	A1F ONLY
	2	DG9-0150-000 000	B	1	REAR COVER ASS'Y	A1E ONLY
	2	DG9-0151-000 000	B	1	REAR COVER ASS'Y	A1F ONLY
	4	DG9-3300-000 000	C	1	RELAY LENS ASS'Y	
	4	DG9-3301-000 000	C	1	ENCORDER C.B.A.	
	4	DG9-3406-000 000	C	1	ZOOM RING ASS'Y	
	14	DH2-0812-000 000	C	1	CABLE, INPUT	
	14	DH2-0813-000 000	C	1	CABLE, OUTPUT	
	14	DH2-1072-000 000	C	1	CORD ASS'Y	
	6	DH2-1001-000 000	C	1	PRINTED CORD	
	6	DH2-1002-000 000	C	1	PRINTED CORD	
	6	DH2-1003-000 000	C	1	PRINTED CORD	
	6	DH2-1004-000 000	C	1	PRINTED CORD	
	4	DH2-1032-000 000	C	1	PRINTED CORD	
	4	DH3-0013-000 000	C	1	DC/DC CONVERTER	
		DH4-0029-000 000	B	1	IC CX20114	
		DH4-0030-000 000	B	1	IC CX20115	
		DH4-0125-000 000	B	1	IC MN53015CXY	
		DH4-0135-000 000	B	1	IC CXA1204Q	
⚠		DH4-0141-000 000	D	1	LINK, IC ICP-N15	
⚠		DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠		DH4-0144-000 000	D	2	LINK, IC ICP-F25	
		DH4-0155-000 000	B	1	IC µPD6145G-101	
⚠		DH4-0166-000 000	D	2	LINK, IC D2000	
		DH4-0185-000 000	B	1	IC M37450M4	
		DH4-0189-000 000	B	1	IC CXA1127M	
		DH4-0194-000 000	B	1	IC CXP80116	
		DH4-0197-000 000	B	1	IC CXA1230AR	
		DH4-0198-000 000	B	1	IC CXA1231AR	
		DH4-0203-000 000	B	1	IC µPD75308GF	
		DH4-0205-000 000	B	3	IC LVC556	
		DH4-0213-000 000	B	1	IC µPD7564G	
		DH4-0223-000 000	B	1	IC µPD6144AG-601	
		DH4-0225-000 000	B	1	IC MM1002	
		DH4-0230-000 000	B	1	IC MN3824S	
		DH4-0231-000 000	B	1	IC MN3823S	
		DH4-0244-000 000	B	1	IC MN5138	
		DH6-0245-000 000	C	1	INDUCTOR, VARIABLE	
		DH6-0250-000 000	C	1	INDUCTOR, VARIABLE	
	4	DH8-0033-001 000	C	1	IG METER	
	4	DH9-0294-001 000	C	1	AF MOTOR ASS'Y	
	4	DH9-0295-001 000	C	1	PZ MOTOR ASS'Y	
⚠		DH9-0392-000 000	C	1	COIL 240µH	
		DH9-0406-000 000	C	1	LIQUID CRYSTAL DISPLAY	
	6	DH9-0417-000 000	C	1	MICROPHONE	
⚠		DH9-0437-000 000	C	1	FLYBACK TRANSFORMER	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
2	DS1-5182-000 000	C	1	SPRING, COIL	
2	DS1-6067-000 000	C	1	SPRING, COIL	
2	DY1-1071-000 000	C	1	HEADPHONE JACK C.B.A.	
2	DY1-1072-000 000	C	1	MIC JACK C.B.A.	
6	DY1-1073-000 000	C	1	CRT ASS'Y	
6	DY1-1074-000 000	C	1	REMOCON C.B.A.	
6	DY1-1075-000 000	C	1	E.V.F. C.B.A.	
6	DY1-1076-000 000	B	1	BOTTOM COVER, E.V.F.	
6	DY1-1088-000 000	C	1	RECORDER KEY (1), C.B.A.	A1F ONLY
4	DY1-7105-000 000	C	1	FOCUS LENS ASS'Y	
4	DY1-7106-000 000	C	1	RING, STOPPER	
4	DY1-7107-000 000	C	1	ZOOM LENS ASS'Y	
2	DY2-1113-000 000	B	1	GRIP COVER ASS'Y	
2	DY2-1114-000 000	B	1	KNOB, TELE-WIDE	
6	DY2-1116-000 000	B	1	TOP COVER, E.V.F.	
2	DY2-1134-000 000	B	1	TOP COVER ASS'Y	A1E ONLY
2	DY2-1135-000 000	B	1	TOP COVER ASS'Y	A1F ONLY
2	DY2-1136-000 000	B	1	LEFT COVER ASS'Y	A1E ONLY
2	DY2-1137-000 000	B	1	LEFT COVER ASS'Y	A1F ONLY
4	DY2-1139-000 000	C	1	ACTUATOR ASS'Y	
2	DY2-6017-000 000	B	1	SPORTS FINDER SF-100	
14	DY2-6018-000 000	B	1	WIRELESS CONTROLLER WL-100	A1E ONLY
14	DY2-6020-000 000	B	1	WIRELESS CONTROLLER WL-100F	A1F ONLY
14	DY3-4197-000 000	B	1	COVER BATTERY	
10,12	DY4-2440-000 000	F	3	WASHER	
8	DY4-2452-000 000	F	3	SCREW, CROSS-RECESS	
12	DY4-2527-000 000	F	1	WASHER	
12	DY4-2648-000 000	C	1	COASTER, LEFT	
12	DY4-2649-000 000	C	1	COASTER, RIGHT	
12	DY4-2650-000 000	C	1	GEAR ASS'Y	
8	DY4-2651-000 000	C	1	LOADING MOTOR ASS'Y	
8	DY4-2652-000 000	C	1	ROLLER ASS'Y	
10	DY4-2653-000 000	C	1	ARM, PINCH	
12	DY4-2654-000 000	C	1	GEAR ASS'Y	
12	DY4-2655-000 000	C	1	LEVER, THREADING	
12	DY4-2656-000 000	C	1	GEAR, JOINT	
10	DY4-2657-000 000	C	1	LEVER, SWITCH	
12	DY4-2658-000 000	C	1	WORM ASS'Y	
12	DY4-2659-000 000	C	1	BRAKE, TS	
10	DY4-2660-000 000	C	1	BAND, TENSION	
12	DY4-2661-000 000	C	1	GEAR	
12	DY4-2662-000 000	C	1	ROLLER, GUIDE	
10	DY4-2663-000 000	C	1	REEL, SUPPLY	
10	DY4-2664-000 000	C	1	ARM, TG7	
12	DY4-2665-000 000	C	1	ARM, PINCH SUB	
10	DY4-2666-000 000	C	1	REEL, TAKE UP	
12	DY4-2667-000 000	C	1	GEAR	
12	DY4-2668-000 000	C	1	GEAR	
10	DY4-2669-000 000	C	1	ARM	
12	DY4-2671-000 000	C	1	PULLEY, RELAY	
12	DY4-2672-000 000	C	1	PLATE, SS	
8	DY4-2673-000 000	C	1	CASSETTE COMPARTMENT ASS'Y	
12	DY4-2674-000 000	C	1	ROLLER, GUIDE	
8	DY4-2675-000 000	C	1	TERMINAL, EARTH	
10	DY4-2676-000 000	C	1	SWITCH	
10	DY4-2677-000 000	C	1	SWITCH, SLIDE	
10	DY4-2678-000 000	C	1	SWITCH, PUSH	
10	DY4-2679-000 000	C	1	FLEXIBLE P.C.B. (1)	
10	DY4-2680-000 000	C	1	FLEXIBLE P.C.B. (2)	
10,12	DY4-2681-000 000	F	4	WASHER	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	12	DY4-2684-000 000	C	1	PLATE, TT	
	12	DY4-2685-000 000	C	2	SPRING, LEAF	
	12	DY4-2686-000 000	F	2	SCREW, CROSS-RECESS	
	12	DY4-2687-000 000	C	1	GEAR, WHEEL	
	10,12	DY4-2688-000 000	F	6	WASHER	
	12	DY4-2689-000 000	F	2	SCREW, CROSS-RECESS	
	10	DY4-2690-000 000	C	1	PLATE, TL	
	10	DY4-2691-000 000	C	1	BRAKE, LB	
	10	DY4-2692-000 000	C	1	LEVER, LB	
	12	DY4-2693-000 000	C	1	ARM, RELEASE	
	12	DY4-2694-000 000	C	1	GEAR, UL	
	12	DY4-2695-000 000	C	1	ARM, UL	
	10	DY4-2696-000 000	C	4	PIN, SHAFT	
	10	DY4-2697-000 000	C	1	SPRING, COIL	
	12	DY4-2698-000 000	C	1	SPRING, COIL	
	10	DY4-2699-000 000	C	1	SPRING, COIL	
	12	DY4-2700-000 000	C	1	SPRING	
	10	DY4-2701-000 000	C	1	FLANGE, TG2	
	10	DY4-2702-000 000	C	1	ROLLER, TG2	
	10	DY4-2703-000 000	C	1	FLANGE, TG2	
	10	DY4-2704-000 000	C	1	SLEEVE, TG2	
	10	DY4-2705-000 000	C	1	SPRING, COIL	
	12	DY4-2706-000 000	C	1	SPRING, COIL	
	10	DY4-2707-000 000	C	1	SPRING, PLATE	
	8	DY4-2708-000 000	C	1	SPRING, COIL	
	8	DY4-2709-000 000	C	1	GEAR, DAMPER	
	10	DY4-2710-000 000	C	1	HOLDER, LED	
	12	DY4-2711-000 000	C	1	LEVER, EJECT	
	10	DY4-2712-000 000	C	1	ARM RELEASE	
	10	DY4-2713-000 000	C	1	BRAKE, S	
	10	DY4-2714-000 000	C	1	BRAKE, T	
	12	DY4-2715-000 000	C	1	BRAKE, UL	
	10	DY4-2716-000 000	C	1	ARM, STOPPER	
	10	DY4-2717-000 000	C	1	ARM, ADJUST	
	12	DY4-2718-000 000	E	1	BELT (L), TIMING	
	12	DY4-2719-000 000	E	1	BELT (S), TIMING	
	8	DY4-2720-000 000	C	1	DAMPER, OIL	
	8	DY4-2721-000 000	C	1	GUARD, GUIDE	
	10	DY4-2722-000 000	C	2	HOLDER, SENSOR	
	10	DY4-2723-000 000	C	1	STOPPER, RK	
	10	DY4-2724-000 000	C	1	SPRING, COIL	
	10	DY4-2725-000 000	C	1	PLATE, SWITCH	
	8	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
	8,10	DY4-2727-000 000	F	8	SCREW, CROSS-RECESS	
	8,10,12	DY4-2728-000 000	F	7	SCREW, CROSS-RECESS	
	8	DY4-2729-000 000	C	2	TAPE	
	8	DY4-2730-000 000	F	5	SCREW, CROSS-RECESS	
	8	DY4-2738-000 000	E	1	DRUM ASS'Y	
	8	DY4-2739-000 000	E	1	UPPER DRUM ASS'Y	
	14	DY5-1459-000 000	C	1	BATTERY COMPARTMENT	
	14	DY5-1460-000 000	C	1	SHOE ASS'Y	
	14	DY5-1461-000 000	C	1	CORD ASS'Y	
	14	DY5-1467-000 000	C	1	CORD, BATTERY	
	14	DY5-1468-000 000	C	1	NUT	
	14	DY5-1469-000 000	C	1	SHOE ASS'Y	
	14	DY5-1470-000 000	C	1	WASHER	
	14	DY5-1471-000 000	C	1	SCREW, CROSS-RECESS	
⚠		VC5-2970-106 000	C	1	CAPACITOR, ELECT. 10µF/16V	
⚠		VC5-9520-102 000	C	1	CAPACITOR, CERA. 1000pF/1KV	
⚠		VC5-9850-472 000	C	1	CAPACITOR, FILM 4700pF/100V	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	VC6-0340-100 000	C	2	CAPACITOR, TRIMMER 10pF	
	VC6-0340-200 000	C	1	CAPACITOR, TRIMMER 20pF	
	VC6-0340-300 000	C	3	CAPACITOR, TRIMMER 30pF	
⚠	VC6-1570-152 000	C	1	CAPACITOR, CERA. 1500pF/500V	
	VC6-3670-200 000	C	1	CAPACITOR, TRIMMER 20pF	
	VR5-3690-201 000	C	1	RESISTOR, VARIABLE 200Ω	
	VR5-3690-502 200	C	1	RESISTOR, VARIABLE 5KΩ	
⚠	VR5-4710-205 000	C	1	RESISTOR, VARIABLE 2MΩ	
	VR5-4710-504 000	C	1	RESISTOR, VARIABLE 500KΩ	
	VR5-5320-104 000	C	1	RESISTOR, VARIABLE 100KΩ	
	VR5-5320-502 000	C	1	RESISTOR, VARIABLE 5KΩ	
	VR5-7780-102 000	C	2	RESISTOR, VARIABLE 1KΩ	
	VR5-7780-103 000	C	16	RESISTOR, VARIABLE 10KΩ	
	VR5-7780-222 000	C	3	RESISTOR, VARIABLE 2.2KΩ	
	VR5-7780-223 000	C	7	RESISTOR, VARIABLE 22KΩ	
	VR5-7780-224 000	C	1	RESISTOR, VARIABLE 220KΩ	
	VR5-7780-471 000	C	1	RESISTOR, VARIABLE 470Ω	
	VR5-7780-472 000	C	4	RESISTOR, VARIABLE 4.7KΩ	
	VR5-7780-473 000	C	2	RESISTOR, VARIABLE 47KΩ	
	VS1-0875-008 000	C	2	CONNECTOR 8P	
	VS1-0875-010 000	C	2	CONNECTOR 10P	
	VS1-0875-011 000	C	1	CONNECTOR 11P	
	VS1-0875-013 000	C	1	CONNECTOR 13P	
	VS1-0875-015 000	C	1	CONNECTOR 15P	
	VS1-0875-016 000	C	2	CONNECTOR 16P	
	VS1-0875-020 000	C	2	CONNECTOR 20P	
	VS1-0876-020 000	C	1	CONNECTOR 20P	
	WA1-0380-000 000	B	2	DIODE MA157	
	WA1-0384-000 000	B	1	ZENER DIODE RD5.6MB2	
	WA1-0547-000 201	B	4	DIODE 1SS184	
	WA1-0612-000 201	B	2	DIODE E10QS03	
	WA1-0696-000 201	B	1	DIODE MA152WA	
	WA1-0953-000 000	B	1	DIODE MA716	
	WA1-0961-000 000	B	24	DIODE MA112	
	WA1-0962-000 000	B	5	DIODE MA121	
	WA1-0985-000 000	B	1	DIODE MA341	
	WA1-0989-000 000	B	1	DIODE MA3100W	
	WA1-1123-000 000	B	1	DIODE AG01Z	
	WA1-1124-000 000	B	1	DIODE SHV02	
	WA1-1146-000 000	B	1	DIODE MA707	
	WA2-0052-000 000	B	3	TRANSISTOR 2SC1621	
	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162 (GR,BL)	
	WA2-0481-000 000	B	1	TRANSISTOR 2SD968A	
	WA2-0735-000 201	B	18	TRANSISTOR 2SC2712 (GR,BL)	
	WA2-0759-000 000	B	2	TRANSISTOR DTA144EK	
	WA2-0760-000 000	B	2	TRANSISTOR DTC114TK	
	WA2-0797-000 201	B	4	TRANSISTOR 2SA1213 (Y)	
	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
	WA2-0884-000 000	B	14	TRANSISTOR DTC144EK	
	WA2-1089-000 000	B	1	TRANSISTOR DTC124EK	
	WA2-1098-000 000	B	1	TRANSISTOR FMS1	
	WA2-1099-000 000	B	3	TRANSISTOR FMW1	
	WA2-1121-000 000	B	3	TRANSISTOR DTC143EK	
	WA2-1172-000 000	B	3	TRANSISTOR 2SA1461	
	WA2-1201-000 000	B	1	TRANSISTOR IMZ2	
	WA2-1228-000 000	B	7	TRANSISTOR IMT2	
	WA2-1230-000 000	B	4	TRANSISTRO IMH6	
	WA2-1231-000 000	B	6	TRANSISTOR IMH8	
	WA2-1232-000 000	B	10	TRANSISTOR IMZ1	
	WA2-1234-000 000	B	12	TRANSISTOR IMX2	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	WA2-1235-000 000	B	2	TRANSISTOR IMB6	
	WA2-1248-000 000	B	2	TRANSISTOR DTA124EK	
	WA2-1256-000 000	B	2	TRANSISTOR IMH5	
	WA2-1368-000 000	B	1	TRANSISTOR, DTC114EK	
	WA2-1436-000 000	B	1	TRANSISTOR 2SB962-7	
	WA2-1437-000 000	B	4	TRANSISTOR 2SB1121 (S,T)	
	WA2-1498-000 000	B	14	TRANSISTOR 2SA1162 (GR/Y)	
	WA2-1501-000 000	B	3	TRANSISTOR 2SK198	
	WA3-3900-000 000	B	1	IC µPD6147G	
	WA3-4010-000 000	B	1	IC S-2940IF	
	WA3-4018-000 000	B	1	IC TC7SU04F	
	WA4-0264-000 201	B	2	IC NJM2902M	
	WA4-0311-000 000	B	1	IC NJM2903M	
	WA4-0349-000 201	B	2	IC NJM2904M	
	WA4-0458-000 000	B	1	IC NJM3414M	
	WA4-0511-000 000	B	1	IC AN2510S	
	WA4-0901-000 000	B	1	IC AN2011S	
	WA4-0905-000 000	B	1	IC TA7733F	
	WA4-1075-000 000	B	1	IC AN2153NS	
	WA4-1076-000 000	B	1	IC AN2253FAP	
	WA4-1145-000 000	B	2	IC RH5VA45AA	
	WA4-1167-000 000	B	2	IC RH5RA50AA	
	WA4-1292-000 000	B	1	IC LVA522	
	WG1-0427-000 000	B	1	LED LT1D51A	
6	XA1-7200-259 000	F	2	SCREW, CROSS-RECESS, PH	
2	XA1-7200-309 000	F	2	SCREW, CROSS-RECESS, PH	
6	XA1-7200-357 000	F	10	SCREW, CROSS-RECESS, PH	
2	XA1-7200-509 000	F	3	SCREW, CROSS-RECESS, PH	
4	XA1-7260-609 000	F	2	SCREW, CROSS-RECESS, PH	
4	XA4-4170-409 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4170-509 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4170-609 000	F	4	SCREW, CROSS-RECESS	
4	XA4-4200-609 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4200-909 000	F	3	SCREW, CROSS-RECESS	
6	XA4-8200-609 000	F	2	SCREW, CROSS-RECESS, FCH	
2	XA4-8200-709 000	F	2	SCREW, CROSS-RECESS, FCH	
2	XA4-9200-359 000	F	1	SCREW, CROSS-RECESS, PH	
2,4	XA4-9200-509 000	F	43	SCREW, CROSS-RECESS, PH	
2	XA4-9200-609 000	F	14	SCREW, CROSS-RECESS, PH	
4	XA4-9201-009 000	F	3	SCREW, CROSS-RECESS, FCH	
4,6	XA9-0484-000 000	F	6	SCREW, CROSS-RECESS, FCH	
14	XB4-6201-609 000	F	2	SCREW, CROSS-RECESS	
4	XB6-7260-609 000	F	1	SCREW, CROSS-RECESS, WH	
4	X91-1727-090 000	F	1	SCREW, CROSS-RECESS, PH	
4	X91-1737-300 000	F	2	SCREW, CROSS-RECESS, PH	
4	X91-1737-610 000	F	1	SCREW, CROSS-RECESS, PH	
6	X99-0617-000 000	F	2	SCREW, CROSS-RECESS	
2	X99-0619-000 000	F	2	SCREW, CROSS-RECESS	
10	Y22-8012-000 000	B	1	LED GL452S	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
10	Y22-8121-000 000	B	2	SENSOR, PHOTO TL907-0	
10	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	

CONTENTS

CHAPTER IV. DIAGRAMS

1. Interconnection Diagram IV-1

2. Block Diagrams
2-1 Camera section IV-2
2-2 Syscon-servo section IV-3
2-3 Audio-video section IV-4

3. Circuit Board/Schematic Diagrams
3-1 PROCESS CAMERA-KEY C.B.A. IV-5, 6
3-2 SYSCON-SERVO RECORDER-KEY1 C.B.A. IV-7, 8
3-3 VIDEO C.B.A. IV-9, 10
3-4 EVF C.B.A. IV-11, 12

<Guide to diagrams>

1. Color coding

(1) Voltage on circuit diagram
Red : Recording
Black : Playback

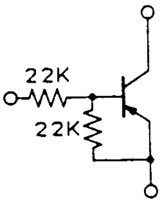
(2) Signal lines on circuit diagram
<Camera>
Red : Power supply line
Blue : Luminance signal
Orange : Chrominance signal
Hatched brack (▨): Luminance + Chrominance signals
<Recorder>
Red : Power supply line
Blue (———) : Capstan PWM signal
(– – – –) : Capstan ATF signal
(—·—) : Capstan FG signal
Orange (———) : Drum PWM signal
(– – – –) : Drum FG signal
(—·—) : Drum PG signal
Hatched black (▨): Recording luminance + Chrominance signals
( ): Playback
Blue (———) : Recording luminance signal
(– – – –) : Playback luminance signal
Orange (———) : Recording chrominance signal
(– – – –) : Playback chrominance signal

(3) Single lines in block diagrams
<Camera section>
Red (———) : Luminance signal
(– – – –) : Chrominance signal
<Video section>
Red (———) : Recording
(– – – –) : Playback
<Syscon-servo section>
Red (———) : Drum servo signal
(– – – –) : Capstan servo signal

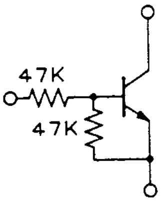
(4) PC board layout

Orange : Component side
Hatched black (▨) : Soldering side
Black : Parts on component side
Blue : Parts on soldering side

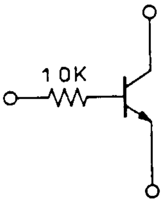
2. Equivalent circuits of digital transistors



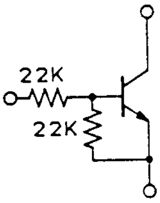
DTA124EK



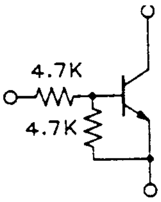
DTA144EK



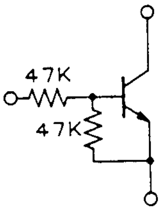
DTC114TK



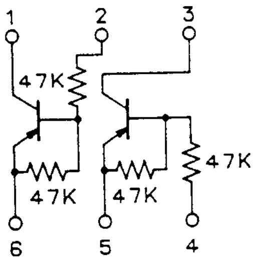
DTC124EK



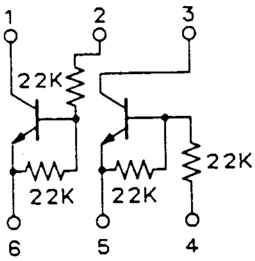
DTC143EK



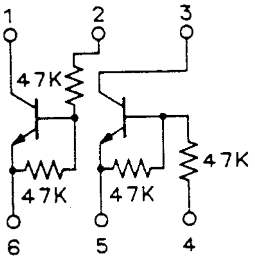
DTC144EK


1
2
3
47K
47K
47K
47K
6
5
4

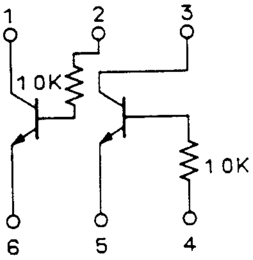
IMB6


1
2
3
22K
22K
22K
22K
6
5
4

IMH5


1
2
3
47K
47K
47K
47K
6
5
4

IMH6


1
2
3
10K
10K
6
5
4

IMH8

3. Indications on circuit diagram

3-1 ° Units of value:

1) Resistance is represented in ohms (Ω).
2) Capacitance is represented in farads (F).
3) Wattage of resistor is 1/16 W unless otherwise specified.

° Measuring equipments:

1) Voltages are measured with a digital voltmeter.
2) Waveform photographs are taken by using a 10:1 probe.

° Nos. on diagrams:

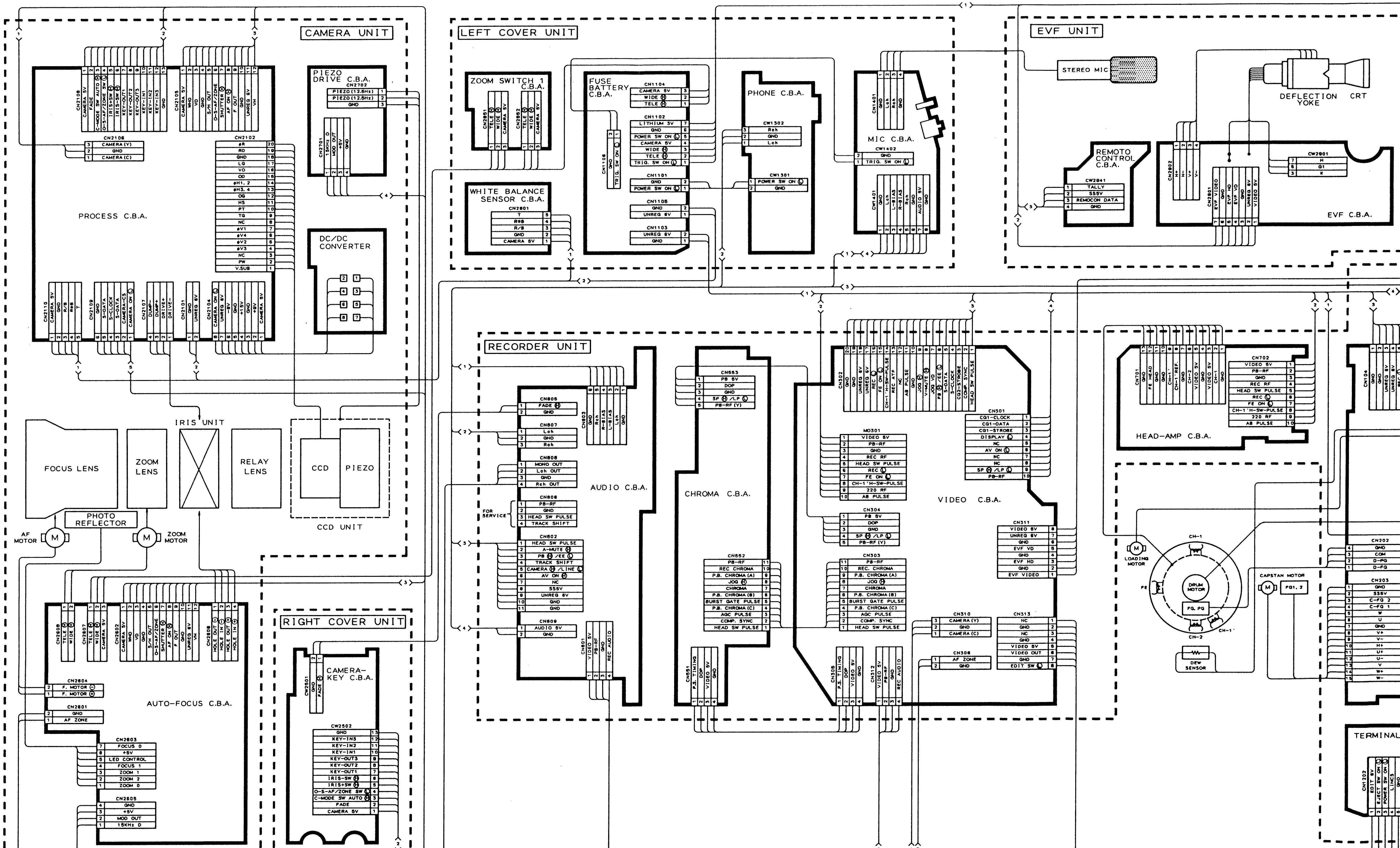
1) IC No. in each C.B.A.s are listed on the bottom of diagrams.
2) No. colored in blue are corresponded to the No. of waveform photographs.

3-2 Measuring conditions

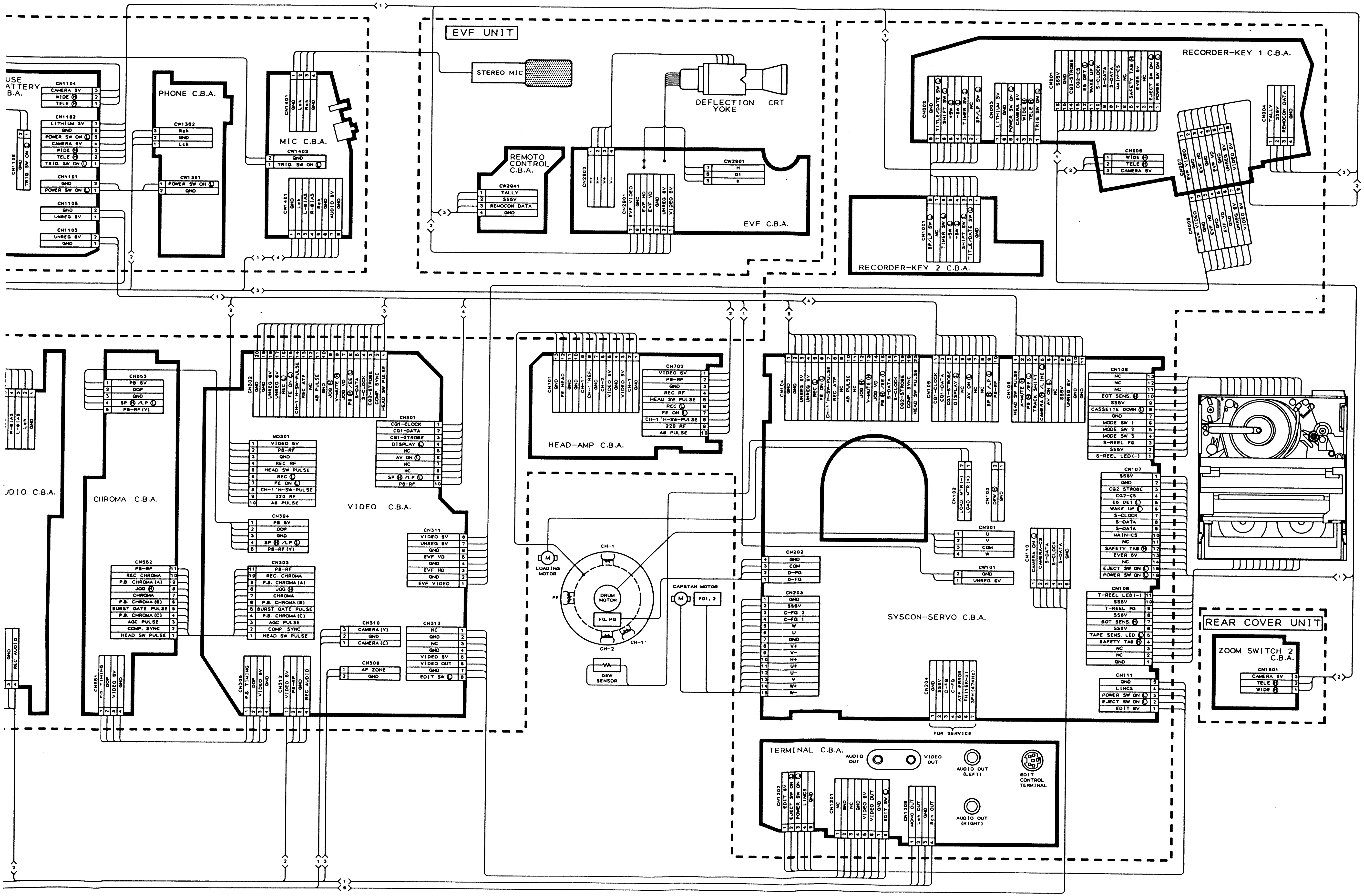
1) Camera section
Colorbar, standard angle of view, AWB-preset

2) Recorder section
Recording : Colorbar (pattern generator)
Playback : Self-recording Playback (colorbar)

INTERCONNECTION DIAGRAM



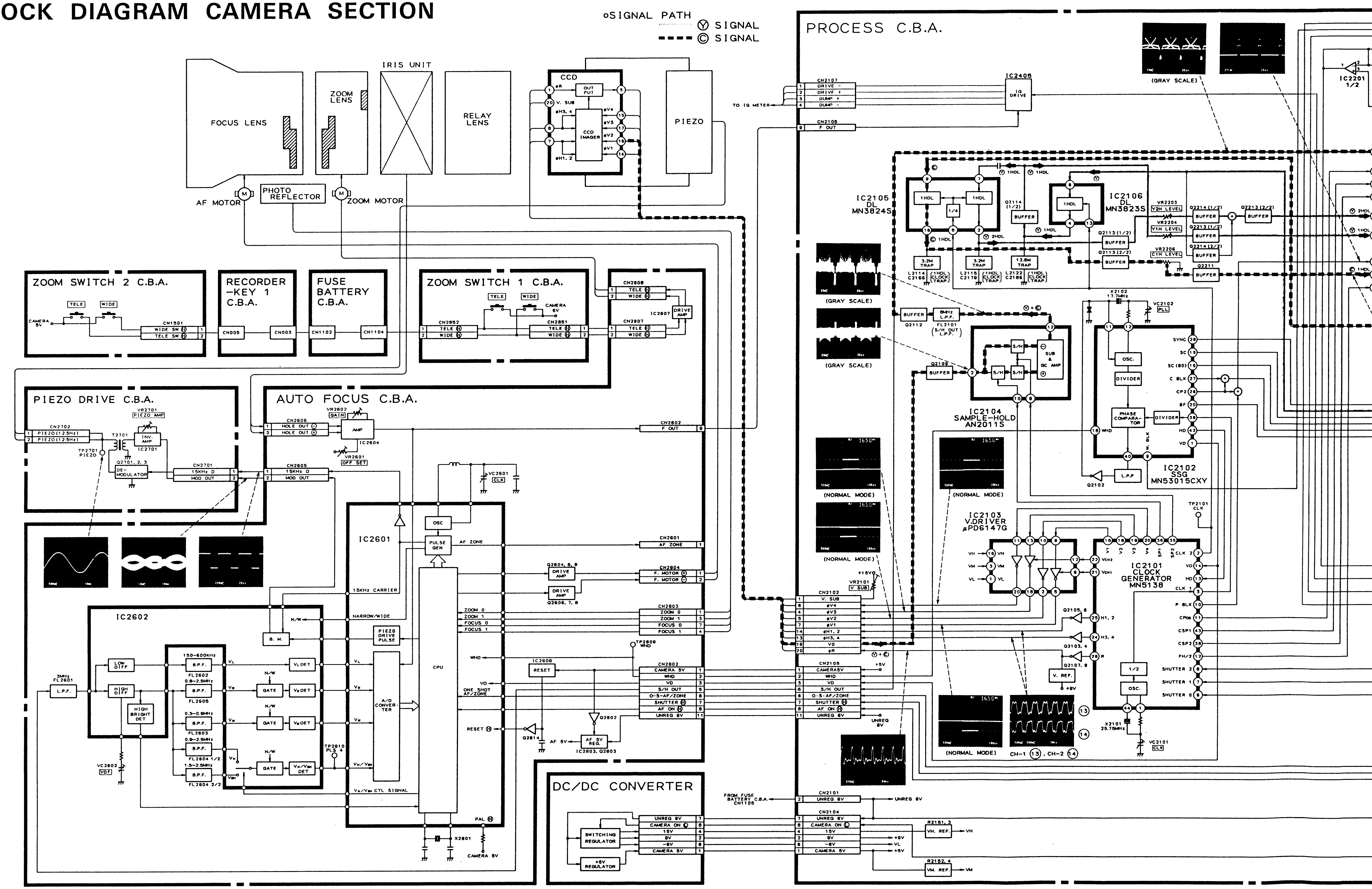
CAMERA UNIT
PROCESS C.B.A.
PIEZO DRIVE C.B.A.
DC/DC CONVERTER
CN2108
CN2105
CN2106
CN2102
CN2701
CN2702
CN2110
CN2109
CN2107
CN2101
CN2104
IRIS UNIT
FOCUS LENS
ZOOM LENS
RELAY LENS
CCD
PIEZO
CCD UNIT
PHOTO REFLECTOR
AF MOTOR
ZOOM MOTOR
AUTO-FOCUS C.B.A.
CN2808
CN2807
CN2802
CN2806
CN2804
CN2801
CN2803
CN2805
RIGHT COVER UNIT
CAMERA-KEY C.B.A.
CW2501
CW2502
LEFT COVER UNIT
ZOOM SWITCH 1 C.B.A.
CN2851
CN2852
WHITE BALANCE SENSOR C.B.A.
CN2801
FUSE BATTERY C.B.A.
CN1104
CN1102
CN1101
CN1105
CN1103
CN1106
PHONE C.B.A.
CW1302
CW1301
MIC C.B.A.
CN1401
CW1402
CW1401
EVF UNIT
STEREO MIC
DEFLECTION YOKE
CRT
REMOTO CONTROL C.B.A.
CW2941
EVF C.B.A.
CN2802
CN2801
CW2901
RECORDER UNIT
AUDIO C.B.A.
CN805
CN807
CN808
CN806
CN802
CN809
CN803
CN801
FOR SERVICE
CHROMA C.B.A.
CN653
CN652
CN651
VIDEO C.B.A.
CN302
CN301
MO301
CN304
CN303
CN311
CN310
CN313
CN308
CN306
CN312
HEAD-AMP C.B.A.
CN701
CN702
LOADING MOTOR
CAPSTAN MOTOR
FG1, 2
DRUM MOTOR
FG, PG
CH-1
CH-2
CH-1'
FE
DEW SENSOR
CN104
CN202
CN203
TERMINAL
CN102



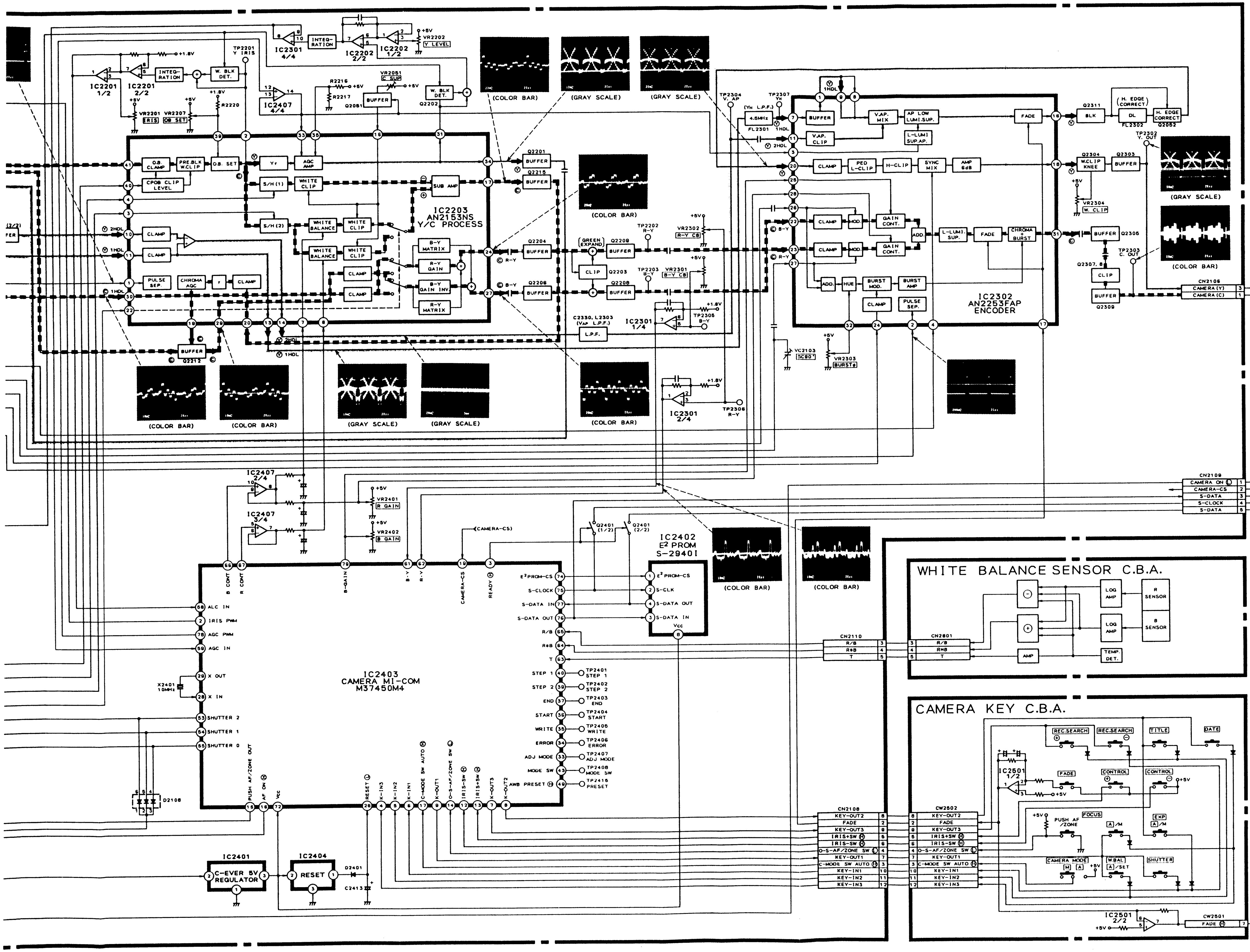
EVF UNIT
STEREO MIC
DEFLECTION YOKE
CRT
REMOTO CONTROL C.B.A.
CW2941
TALLY
S5.5V
REMOCON DATA
GND
CN2802
H+
H-
V+
V-
CN2901
EVF VIDEO
GND
EVF HD
EVF VD
GND
UNREG 6V
VIDEO 6V
CW2901
H
G1
K
EVF C.B.A.
PHONE C.B.A.
CW1302
Rch
GND
Lch
CW1301
POWER SW ON
GND
MIC C.B.A.
CN1401
Lch
Rch
GND
CW1402
GND
TRIG. SW ON
CW1401
L-BIAS
R-BIAS
Rch
Lch
AUDIO 6V
GND
CN1104
CAMERA 5V
WIDE
TELE
CN1102
LITHIUM 3V
GND
POWER SW ON
CAMERA 5V
WIDE
TELE
TRIG. SW ON
CN1101
GND
POWER SW ON
CN1105
GND
UNREG 6V
CN1103
UNREG 6V
GND
CN1106
GND
TRIG. SW ON
USE
ATTERY
.B.A.
RECORDER-KEY 1 C.B.A.
CN002
TITLE/DATE SW
SHIFT SW
+SW
-SW
TIMER SW
NC
SP/LP SW
CN003
LITHIUM 3V
GND
POWER SW ON
CAMERA 5V
WIDE
TELE
TRIG SW ON
CN001
S5.5V
GND
CQ2-STROBE
CQ2-CS
E6 DET
WAKE UP
S-CLOCK
S-DATA
MAIN-CS
NC
SAFETY TAB
EVER 5V
NC
EJECT SW ON
POWER SW ON
CN004
TALLY
S5.5V
REMOCON DATA
GND
CN005
WIDE
TELE
CAMERA 5V
CN007
EVF VIDEO
GND
EVF HD
EVF VD
GND
UNREG 6V
VIDEO 6V
CN008
EVF VIDEO
GND
EVF HD
EVF VD
GND
UNREG 6V
VIDEO 6V
RECORDER-KEY 2 C.B.A.
CN1001
SP/LP SW
NC
TIMER SW
-SW
+SW
SHIFT SW
TITLE/DATE SW
GND
R-BIAS
L-BIAS
Lch
GND
UDIO C.B.A.
GND
REC AUDIO
CHROMA C.B.A.
CN553
PB 5V
DOP
GND
SP / LP
PB-RF (Y)
CN552
PB-RF
REC CHROMA
P.B. CHROMA (A)
JOG
CHROMA
P.B. CHROMA (B)
BURST GATE PULSE
P.B. CHROMA (C)
AGC PULSE
COMP. SYNC
HEAD SW PULSE
CN551
P.S. TIMING
DOP
VIDEO 5V
GND
VIDEO C.B.A.
CN302
GND
GND
UNREG 6V
REC
FE ON
REC RF
CH-1'H-SW-PULSE
REC ATF
AB PULSE
NC
JOG
V-MUTE
JOG VD
PB / EE
S-DATA
S-CLOCK
CQ2-STROBE
COMP. SYNC
HEAD SW PULSE
MO301
VIDEO 5V
PB-RF
GND
REC RF
HEAD SW PULSE
REC
FE ON
CH-1'H-SW-PULSE
220 RF
AB PULSE
CN304
PB 5V
DOP
GND
SP / LP
PB-RF (Y)
CN303
PB-RF
REC. CHROMA
P.B. CHROMA (A)
JOG
CHROMA
P.B. CHROMA (B)
BURST GATE PULSE
P.B. CHROMA (C)
AGC PULSE
COMP. SYNC
HEAD SW PULSE
CN301
CQ1-CLOCK
CQ1-DATA
CQ1-STROBE
DISPLAY
NC
AV ON
NC
NC
SP / LP
PB-RF
CN311
VIDEO 6V
UNREG 6V
GND
EVF VD
GND
EVF HD
GND
EVF VIDEO
CN310
CAMERA (Y)
GND
CAMERA (C)
CN308
AF ZONE
GND
CN313
NC
GND
NC
GND
VIDEO 5V
VIDEO OUT
GND
EDIT SW
CN305
P.S. TIMING
DOP
GND
CN312
VIDEO 5V
PB-RF
GND
REC AUDIO
HEAD-AMP C.B.A.
CN701
FE HEAD
GND
CH-1
CH-1'REF
GND
CH-2
VIDEO 5V
GND
CH-1
CN702
VIDEO 5V
PB-RF
GND
REC RF
HEAD SW PULSE
REC
FE ON
CH-1'H-SW-PULSE
220 RF
AB PULSE
LOADING MOTOR
CH-1
CH-2
CH-1'
FE
DRUM MOTOR
FG, PG
DEW SENSOR
CAPSTAN MOTOR
FG1, 2
SYSCON-SERVO C.B.A.
CN104
GND
UNREG 6V
GND
REC
FE ON
REC RF
CH-1'H-SW-PULSE
REC ATF
AB PULSE
NC
JOG
V-MUTE
JOG VD
PB / EE
S-DATA
S-CLOCK
CQ2-STROBE
COMP. SYNC
HEAD SW PULSE
CN105
CQ1-CLOCK
CQ1-DATA
CQ1-STROBE
DISPLAY
NC
AV ON
NC
SP / LP
PB-RF
CN109
HEAD SW PULSE
S-MUTE
TRACK SHIFT
CAMERA ON
AV ON
NC
S5V
GND
GND
CN108
NC
NC
NC
EOT SENS.
S5.5V
CASSETTE DOWN
GND
MODE SW 1
MODE SW 2
MODE SW 3
S-REEL FG
S5.5V
S-REEL LED(-)
CN107
S5.5V
GND
CQ2-STROBE
CQ2-CS
E6 DET
WAKE UP
S-CLOCK
S-DATA
S-DATA
MAIN-CS
NC
SAFETY TAB
EVER 5V
NC
EJECT SW ON
POWER SW ON
CN106
T-REEL LED(-)
S5.5V
T-REEL FG
S5.5V
BOT SENS.
S5.5V
TAPE SENS. LED
SAFETY TAB
NC
NC
GND
CN111
GND
LINCS
POWER SW ON
EJECT SW ON
EDIT 6V
CN102
LOAD MTR(-)
LOAD MTR(+)
CN103
DEW
GND
CN201
U
V
COM
W
CW101
GND
UNREG 6V
CN110
CAMERA ON
CAMERA-CS
S-DATA
S-CLOCK
S-DATA
GND
CN202
GND
COM
D-FG
D-FG
CN203
GND
S5.5V
C-FG 2
C-FG 1
W
U
GND
V+
V-
H+
U+
U-
V
W+
W-
CN204
S5V
D-PG
C-FG
ATF ERROR
FP(16KHz)
3FH(47KHz)
FOR SERVICE
TERMINAL C.B.A.
AUDIO OUT
VIDEO OUT
AUDIO OUT (LEFT)
AUDIO OUT (RIGHT)
EDIT CONTROL TERMINAL
CN1202
EDIT 6V
EJECT SW ON
POWER SW ON
LINCS
GND
CN1201
NC
GND
NC
GND
VIDEO 5V
VIDEO OUT
GND
EDIT SW
CN1208
MONO OUT
Lch OUT
GND
Rch OUT
REAR COVER UNIT
ZOOM SWITCH 2 C.B.A.
CN1801
CAMERA 5V
TELE
WIDE
1
2
3
4
5
6

© CANON INC. 1989

BLOCK DIAGRAM CAMERA SECTION

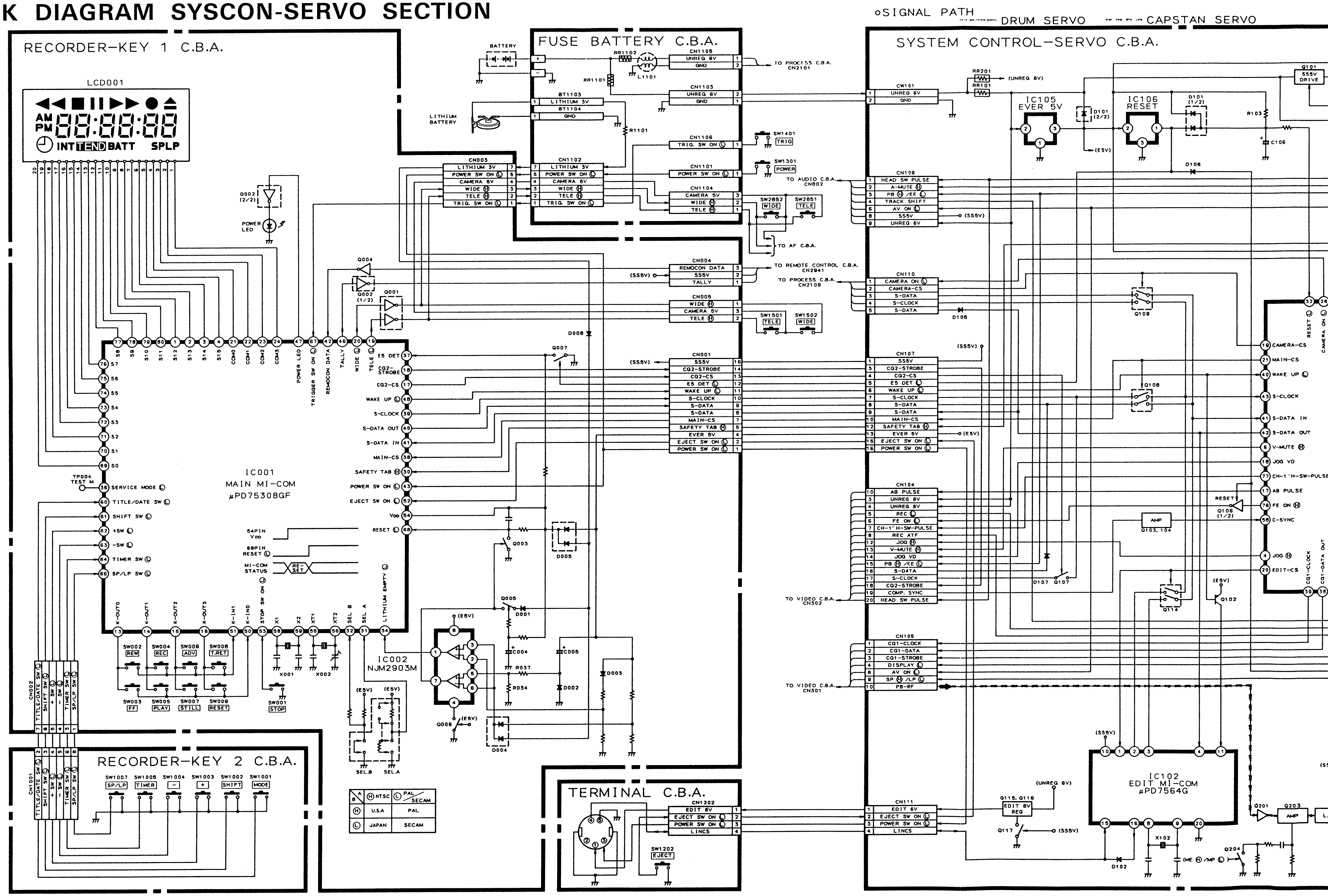


SIGNAL PATH
Y SIGNAL
C SIGNAL
FOCUS LENS
ZOOM LENS
IRIS UNIT
RELAY LENS
CCD
CCD IMAGER
PIEZO
AF MOTOR
PHOTO REFLECTOR
ZOOM MOTOR
PROCESS C.B.A.
ZOOM SWITCH 2 C.B.A.
RECORDER -KEY 1 C.B.A.
FUSE BATTERY C.B.A.
ZOOM SWITCH 1 C.B.A.
PIEZO DRIVE C.B.A.
AUTO FOCUS C.B.A.
IC2601
IC2602
CPU
A/D CONVERTER
PULSE GEN
OSC
PIEZO DRIVE PULSE
DC/DC CONVERTER
SWITCHING REGULATOR
+5V REGULATOR
IC2406 IG DRIVE
TO IG METER
IC2105 DL MN3824S
IC2106 DL MN3823S
IC2104 SAMPLE-HOLD AN2011S
IC2102 SSG MN53015CXY
IC2103 V.DRIVER µPD6147G
IC2101 CLOCK GENERATOR MN5138
IC2201 1/2
(GRAY SCALE)
(NORMAL MODE)
CH-1 ⑬, CH-2 ⑭
FROM FUSE BATTERY C.B.A. CN1108

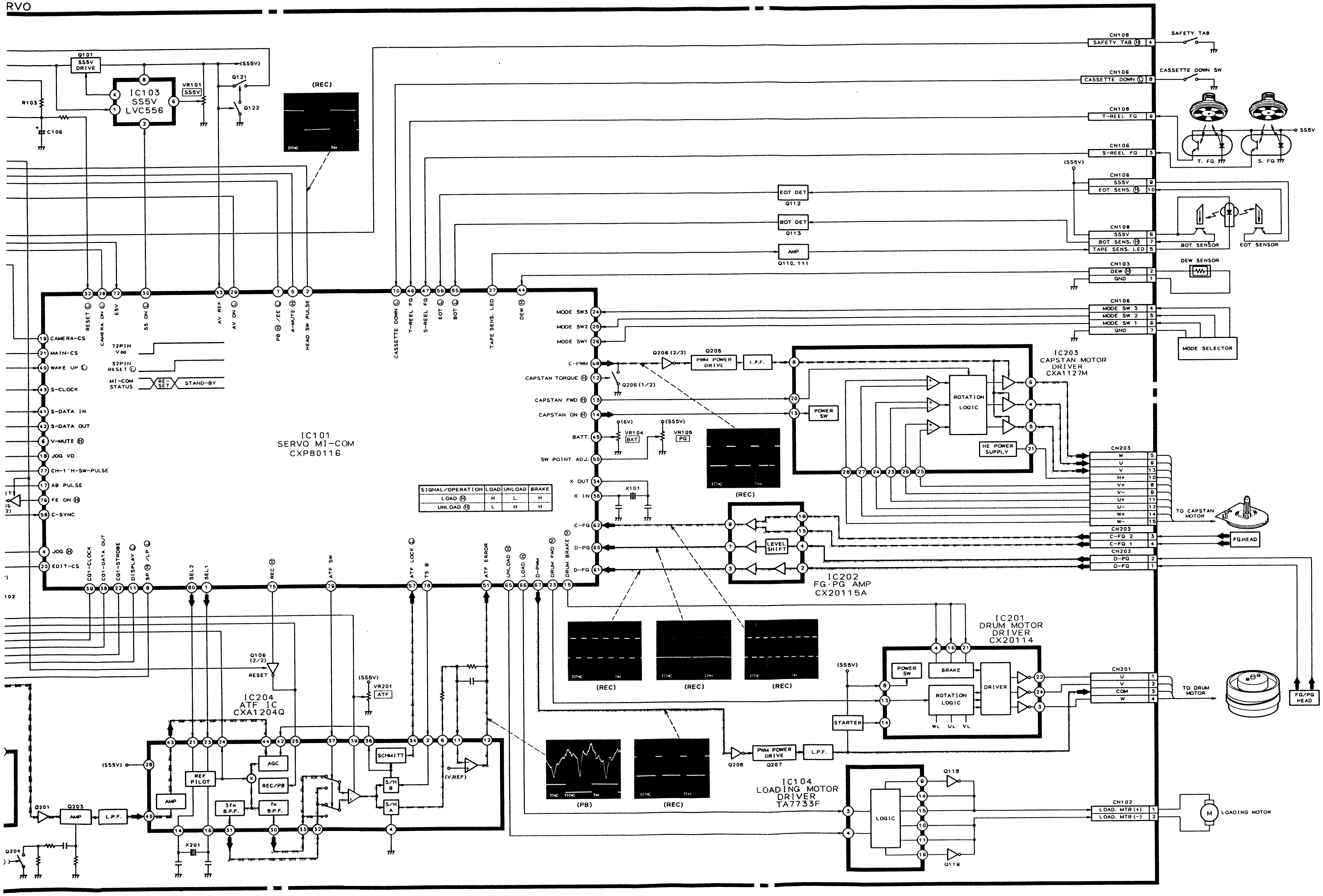

IC2201 1/2
IC2201 2/2
INTEG-RATION
W. BLK DET.
TP2201 Y IRIS
IC2301 4/4
IC2202 2/2
IC2202 1/2
VR2202 Y LEVEL
VR2201 IRIS
VR2207 OB SET
R2220
IC2407 4/4
R2216
R2217
VR2051 C SUP
BUFFER
Q2051
Q2202
(COLOR BAR)
(GRAY SCALE)
(GRAY SCALE)
O.B. CLAMP
PRE.BLK W.CLIP
O.B. SET
Yr
AGC AMP
CPOB CLIP LEVEL
S/H (1)
WHITE CLIP
SUB AMP
S/H (2)
WHITE BALANCE
WHITE CLIP
IC2203 AN2153NS Y/C PROCESS
B-Y MATRIX
R-Y GAIN
B-Y GAIN INV.
R-Y MATRIX
CLAMP
PULSE SEP.
CHROMA AGC
Q2201
Q2215
Q2204
Q2206
Q2212
BUFFER
(COLOR BAR)
(COLOR BAR)
(COLOR BAR)
(GRAY SCALE)
(GRAY SCALE)
(COLOR BAR)
1HDL
2HDL
(GREEN EXPAND)
Q2209
CLIP
Q2203
Q2208
TP2202 R-Y
TP2203 B-Y
VR2302 R-Y C8
VR2301 B-Y C8
C2330, L2303 (VAP L.P.F.)
L.P.F.
IC2301 1/4
TP2305 B-Y
IC2301 2/4
TP2306 R-Y
TP2304 V. AP
TP2307 YH
(YH L.P.F.)
4.5MHz
FL2301
BUFFER
V.AP. MIX
AP LOW LUMI.SUP.
V.AP. CLIP
L-LUMI SUP.AP.
FADE
CLAMP
PED L-CLIP
H-CLIP
SYNC MIX
AMP 6dB
MOD.
GAIN CONT.
ADD
L-LUMI SUP.
FADE
CHROMA + BURST
ADD.
HUE
BURST MOD.
BURST AMP
PULSE SEP.
IC2302 AN2253FAP ENCODER
VC2103 SC80°
VR2303 BURSTφ
Q2311
BLK
(H. EDGE CORRECT)
DL
FL2302
H. EDGE CORRECT
Q2052
TP2302 Y. OUT
Q2304
W.CLIP KNEE
Q2303
BUFFER
VR2304 W. CLIP
(GRAY SCALE)
(COLOR BAR)
Q2305
TP2303 C. OUT
Q2307, 8
CLIP
BUFFER
Q2309
CN2106
CAMERA (Y)
CAMERA (C)
TO VIDEO C.B.A. CN310
CN2109
CAMERA ON
CAMERA-CS
S-DATA
S-CLOCK
S-DATA
TO SYSCON-SERVO C.B.A. CN110
IC2407 2/4
IC2407 3/4
VR2401 R GAIN
VR2402 B GAIN
(CAMERA-CS)
Q2401 (1/2)
Q2401 (2/2)
IC2402 E² PROM S-29401
E² PROM-CS
S-CLK
S-DATA OUT
S-DATA IN
Vcc
(COLOR BAR)
(COLOR BAR)
B CONT
R CONT
B-GAIN
B-Y
R-Y
CAMERA-CS
READY
E² PROM-CS
S-CLOCK
S-DATA IN
S-DATA OUT
R/B
R⊕B
T
ALC IN
IRIS PWM
AGC PWM
AGC IN
X OUT
X IN
X2401 10MHz
SHUTTER 2
SHUTTER 1
SHUTTER 0
IC2403 CAMERA MI-COM M37450M4
STEP 1
STEP 2
END
START
WRITE
ERROR
ADJ MODE
MODE SW
AWB PRESET
TP2401 STEP 1
TP2402 STEP 2
TP2403 END
TP2404 START
TP2405 WRITE
TP2406 ERROR
TP2407 ADJ MODE
TP2408 MODE SW
TP2416 PRESET
D2108
PUSH AF/ZONE OUT
AF ON
Vcc
RESET
K-IN3
K-IN2
K-IN1
C-MODE SW AUTO
K-OUT1
O-S-AF/ZONE SW
IRIS-SW
IRIS+SW
K-OUT3
K-OUT2
IC2401
C-EVER 5V REGULATOR
IC2404
RESET
D2401
C2413
CN2110
CN2801
WHITE BALANCE SENSOR C.B.A.
LOG AMP
R SENSOR
B SENSOR
AMP
TEMP. DET.
CN2108
CW2502
KEY-OUT2
FADE
KEY-OUT3
IRIS+SW
IRIS-SW
O-S-AF/ZONE SW
KEY-OUT1
C-MODE SW AUTO
KEY-IN1
KEY-IN2
KEY-IN3
CAMERA KEY C.B.A.
REC.SEARCH
TITLE
DATE
IC2501 1/2
FADE
CONTROL
FOCUS
PUSH AF /ZONE
A/M
EXP
CAMERA MODE
W.BAL A/SET
SHUTTER
IC2501 2/2
CW2501
FADE
TO AUDIO C.B.A. CN805

© CANON INC. 1989

BLOCK DIAGRAM SYSCON-SERVO SECTION



oSIGNAL PATH
DRUM SERVO
CAPSTAN SERVO
RECORDER-KEY 1 C.B.A.
LCD001
AM PM
INT TEND BATT SPLP
POWER LED
Q002 (2/2)
Q002 (1/2)
Q004
Q001
IC001
MAIN MI-COM
μPD75308GF
S8 S9 S10 S11 S12 S13 S14 S15 COM0 COM1 COM2 COM3
POWER LED
TRIGGER SW ON
REMOCON DATA
TALLY
WIDE
TELE
S7 S6 S5 S4 S3 S2 S1 S0
TP004 TEST M
SERVICE MODE
TITLE/DATE SW
SHIFT SW
+SW
−SW
TIMER SW
SP/LP SW
E5 DET
CQ2-STROBE
CQ2-CS
WAKE UP
S-CLOCK
S-DATA OUT
S-DATA IN
MAIN-CS
SAFETY TAB
POWER SW ON
EJECT SW ON
VDD
RESET
54PIN VDD
68PIN RESET
MI-COM STATUS
RESET
K-OUT0 K-OUT1 K-OUT2 K-OUT3 K-IN1 K-IN0
STOP SW ON
X1 X2 XT1 XT2
SEL B SEL A
LITHIUM EMPTY
SW002 REW
SW004 REC
SW006 ADV
SW008 T.RET
SW003 FF
SW005 PLAY
SW007 STILL
SW009 RESET
SW001 STOP
X001 X002
IC002 NJM2903M
Q005 D001 C004 R037 R034 C005 D002 D003 D004 D005
Q003 Q006 Q007 D008
SEL.B SEL.A
CN002
TITLE/DATE SW
SHIFT SW
+SW
−SW
TIMER SW
SP/LP SW
RECORDER-KEY 2 C.B.A.
CN1001
SW1007 SP/LP
SW1005 TIMER
SW1004 −
SW1003 +
SW1002 SHIFT
SW1001 MODE
A/B: H NTSC / L PAL/SECAM
H: U.S.A / PAL
L: JAPAN / SECAM
BATTERY
LITHIUM BATTERY
FUSE BATTERY C.B.A.
RR1102 RR1101 L1101 R1101
BT1103 LITHIUM 3V
BT1104 GND
CN1105 UNREG 6V GND
TO PROCESS C.B.A. CN2101
CN1103 UNREG 6V GND
CN1106 TRIG. SW ON
SW1401 TRIG
CN1101 POWER SW ON
SW1301 POWER
CN003 / CN1102
LITHIUM 3V
POWER SW ON
CAMERA 5V
WIDE
TELE
TRIG. SW ON
CN1104 CAMERA 5V WIDE TELE
SW2852 WIDE
SW2851 TELE
TO AF C.B.A.
CN004 REMOCON DATA SS5V TALLY
TO REMOTE CONTROL C.B.A. CN2941
CN005 WIDE CAMERA 5V TELE
SW1501 TELE
SW1502 WIDE
CN001
SS5V
CQ2-STROBE
CQ2-CS
E5 DET
WAKE UP
S-CLOCK
S-DATA
S-DATA
MAIN-CS
SAFETY TAB
EVER 5V
EJECT SW ON
POWER SW ON
TERMINAL C.B.A.
CN1202
EDIT 6V
EJECT SW ON
POWER SW ON
LINCS
SW1202 EJECT
SYSTEM CONTROL-SERVO C.B.A.
CW101 UNREG 6V GND
RR201 RR101 (UNREG 6V)
IC105 EVER 5V
IC106 RESET
D101 (2/2)
D101 (1/2)
R103 C106 D106
Q101 SS5V DRIVE
(E5V)
CN129
HEAD SW PULSE
A-MUTE
PB /EE
TRACK SHIFT
AV ON
SS5V
UNREG 6V
TO AUDIO C.B.A. CN802
CN110
CAMERA ON
CAMERA-CS
S-CLOCK
S-DATA
S-DATA
TO PROCESS C.B.A. CN2109
D105 Q109
CN107
SS5V
CQ2-STROBE
CQ2-CS
E5 DET
WAKE UP
S-CLOCK
S-DATA
S-DATA
MAIN-CS
SAFETY TAB
EVER 5V
EJECT SW ON
POWER SW ON
Q108
CN104
AB PULSE
UNREG 6V
UNREG 6V
REC
FE ON
CH-1' H-SW-PULSE
REC ATF
JOG
V-MUTE
JOG VD
PB /EE
S-DATA
S-CLOCK
CQ2-STROBE
COMP. SYNC
HEAD SW PULSE
TO VIDEO C.B.A. CN302
D107 Q107 Q114 Q102
AMP Q103, 104
RESET Q106 (1/2)
CN105
CQ1-CLOCK
CQ1-DATA
CQ1-STROBE
DISPLAY
AV ON
SP /LP
PB-RF
TO VIDEO C.B.A. CN301
CN111
EDIT 6V
EJECT SW ON
POWER SW ON
LINCS
Q115, Q116 EDIT 6V REG
Q117
IC102
EDIT MI-COM
μPD7564G
X102 D102
(ME /MP)
Q201 Q203 AMP Q204
RESET
CAMERA ON
CAMERA-CS
MAIN-CS
WAKE UP
S-CLOCK
S-DATA IN
S-DATA OUT
V-MUTE
JOG VD
CH-1' H-SW-PULSE
AB PULSE
FE ON
C-SYNC
JOG
EDIT-CS
CQ1-CLOCK
CQ1-DATA OUT

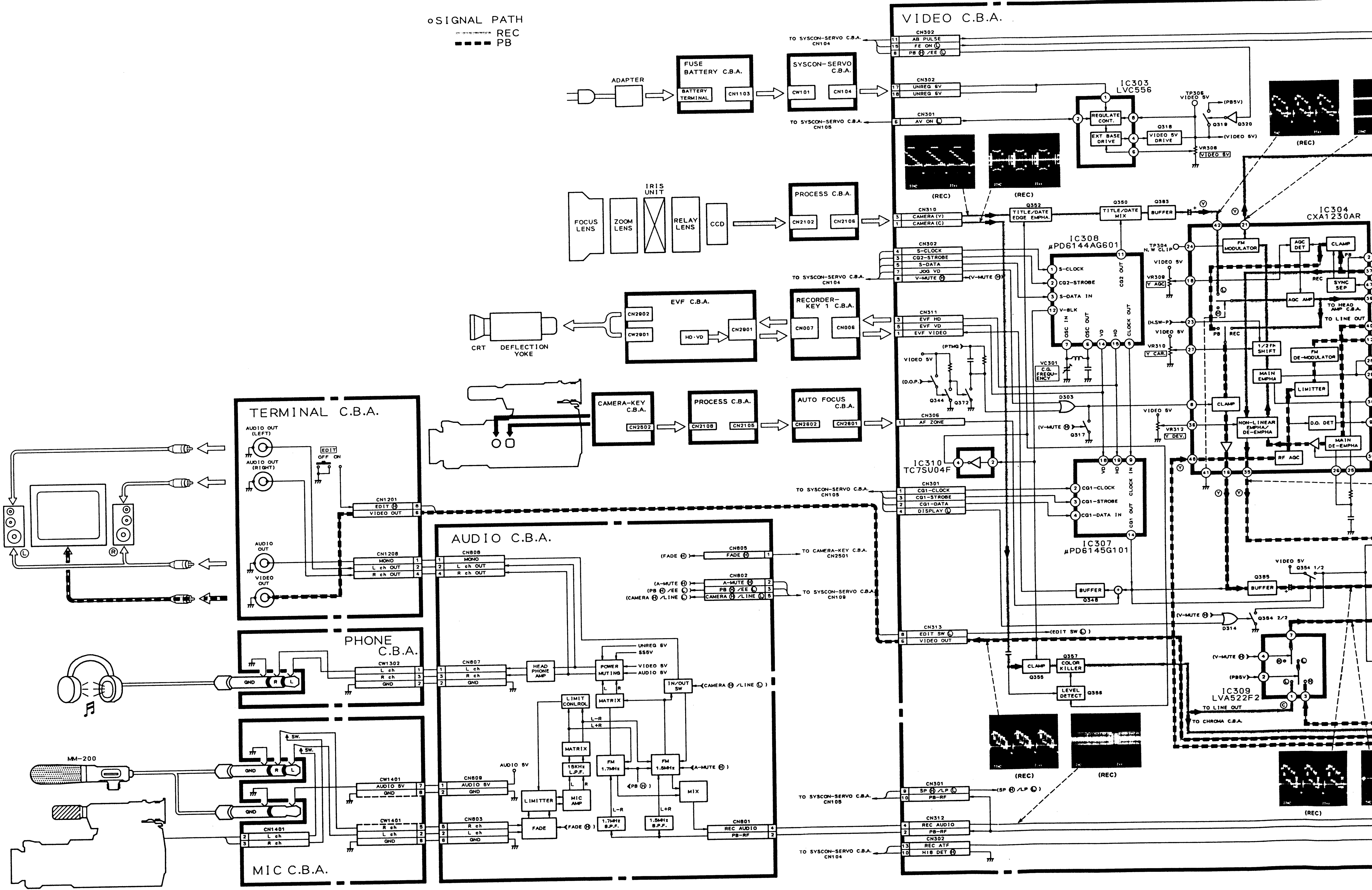


RVO
Q101
SS5V DRIVE
IC103
SS5V
LVC556
VR101
SS5V
(SS5V)
Q121
Q122
R103
C106
(REC)
CN108
SAFETY TAB Ⓗ
SAFETY TAB
CN106
CASSETTE DOWN Ⓛ
CASSETTE DOWN SW
T-REEL FG
S-REEL FG
T. FG
S. FG
SS5V
(SS5V)
SS5V
EOT SENS. Ⓗ
EOT DET
Q112
BOT DET
Q113
AMP
Q110, 111
BOT SENS. Ⓗ
TAPE SENS. LED
BOT SENSOR
EOT SENSOR
CN103
DEW Ⓗ
GND
DEW SENSOR
MODE SW 3
MODE SW 2
MODE SW 1
GND
MODE SELECTOR
RESET Ⓛ
CAMERA ON Ⓛ
E5V
SS ON Ⓛ
AV REF
AV ON Ⓛ
PB Ⓗ /EE Ⓛ
A-MUTE Ⓗ
HEAD SW PULSE
CASSETTE DOWN Ⓛ
T-REEL FG
S-REEL FG
EOT Ⓛ
BOT Ⓛ
TAPE SENS. LED
DEW Ⓗ
CAMERA-CS
MAIN-CS
WAKE UP Ⓛ
S-CLOCK
S-DATA IN
S-DATA OUT
V-MUTE Ⓗ
JOG VD
CH-1 'H-SW-PULSE
AB PULSE
FE ON Ⓗ
C-SYNC
JOG Ⓗ
EDIT-CS
72PIN VDD
37PIN RESET Ⓛ
MI-COM STATUS
RE-SET
STAND-BY
IC101
SERVO MI-COM
CXP80116
MODE SW3
MODE SW2
MODE SW1
C-PWM
CAPSTAN TORQUE Ⓗ
CAPSTAN FWD Ⓗ
CAPSTAN ON Ⓗ
BATT.
SW POINT ADJ.
X OUT
X IN
(6V)
VR104
BAT
VR105
PG
X101
C-FG
D-PG
D-FG
Q206 (2/2)
Q206 (1/2)
Q205
PWM POWER DRIVE
L.P.F.
POWER SW
ROTATION LOGIC
HE POWER SUPPLY
IC203
CAPSTAN MOTOR DRIVER
CXA1127M
CN203
W
U
V
H+
V+
V-
U+
U-
W+
W-
TO CAPSTAN MOTOR
C-FG 2
C-FG 1
CN202
D-PG
D-FG
FG.HEAD
LEVEL SHIFT
IC202
FG·PG AMP
CX20115A
CG1-CLOCK
CG1-DATA OUT
CG1-STROBE
DISPLAY Ⓛ
SP Ⓗ /LP Ⓛ
SEL2
SEL1
REC Ⓗ
ATF SW
ATF LOCK Ⓛ
TS B
ATF ERROR
UNLOAD Ⓗ
LOAD Ⓗ
D-PWM
DRUM FWD Ⓗ
DRUM BRAKE Ⓗ
102
Q106 (2/2)
RESET
(SS5V)
VR201
ATF
IC204
ATF IC
CXA1204Q
AGC
REC/PB
REF PILOT
AMP
3fH B.P.F.
fH B.P.F.
SCHMITT
S/H B
S/H A
(V.REF)
X201
Q201
Q203
AMP
L.P.F.
Q204
(REC)
(REC)
(REC)
(REC)
(PB)
(REC)
IC201
DRUM MOTOR DRIVER
CX20114
POWER SW
BRAKE
DRIVER
ROTATION LOGIC
WL UL VL
STARTER
CN201
U
V
COM
W
TO DRUM MOTOR
FG/PG HEAD
Q208
PWM POWER DRIVE
Q207
L.P.F.
IC104
LOADING MOTOR DRIVER
TA7733F
LOGIC
Q118
Q119
CN102
LOAD. MTR (+)
LOAD. MTR (−)
LOADING MOTOR
M

SIGNAL/OPERATION	LOAD	UNLOAD	BRAKE
LOAD Ⓗ	H	L	H
UNLOAD Ⓗ	L	H	H

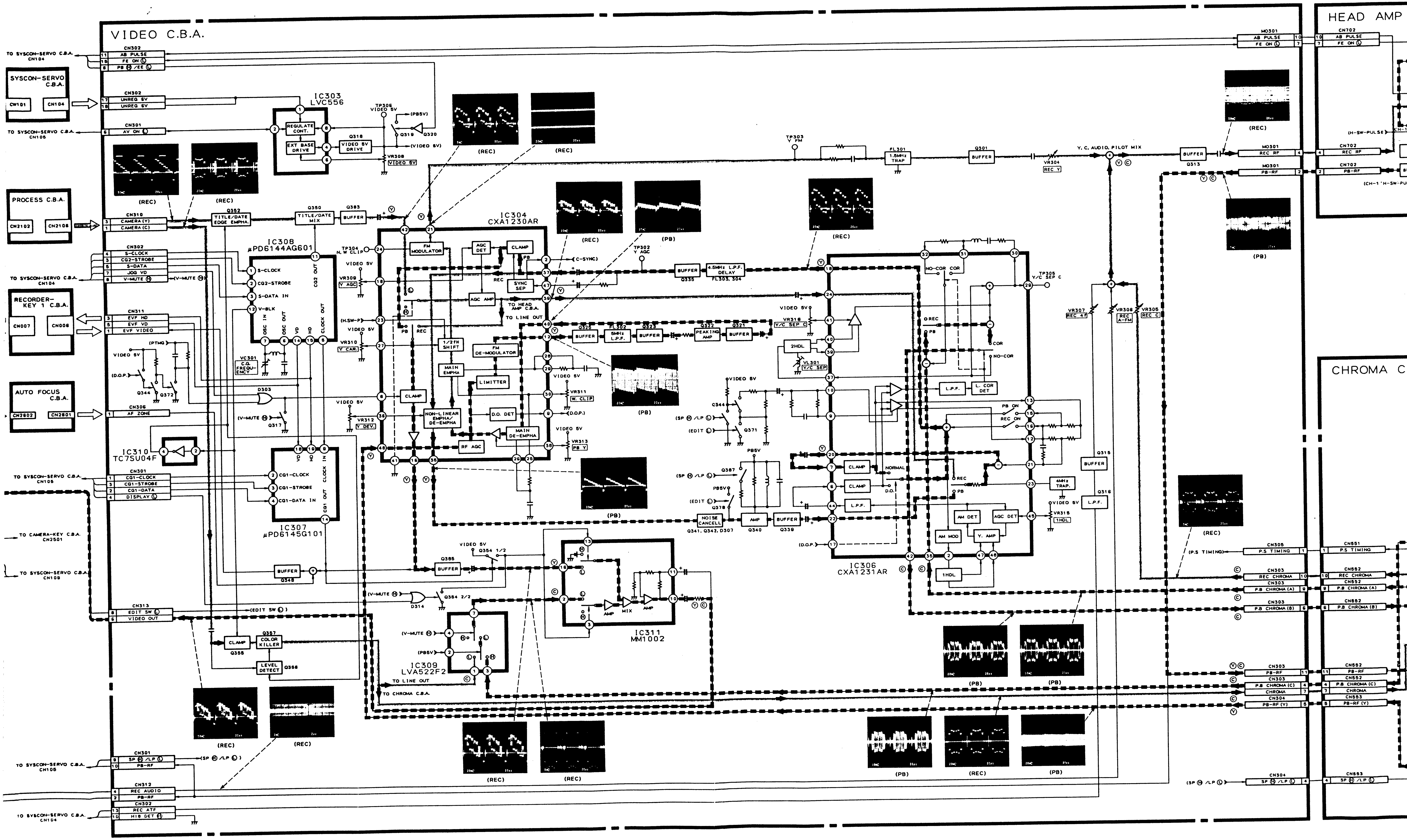
© CANON INC. 1989

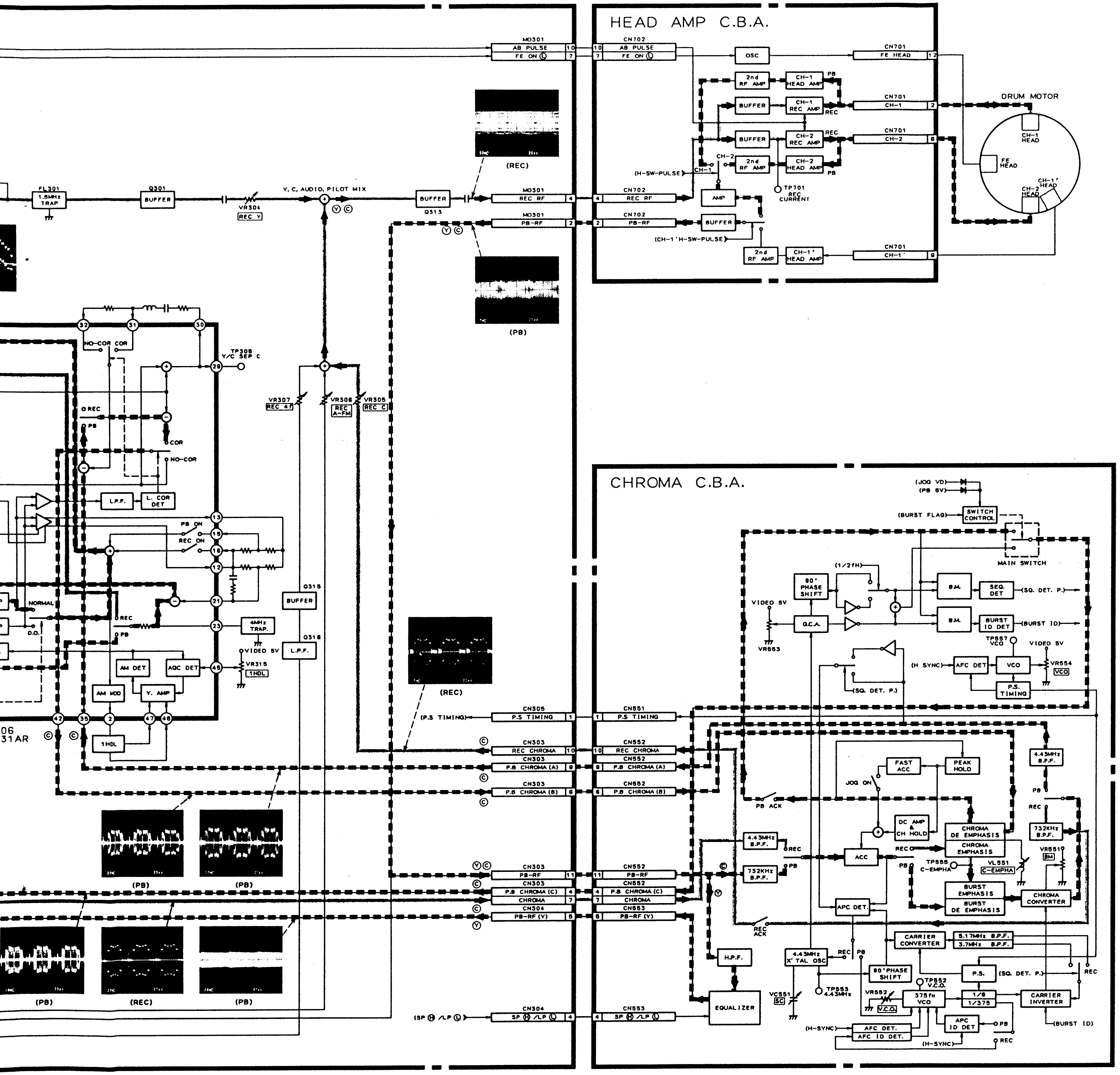
BLOCK DIAGRAM AUDIO-VIDEO SECTION



○SIGNAL PATH
REC
PB
VIDEO C.B.A.
ADAPTER
FUSE BATTERY C.B.A.
BATTERY TERMINAL
CN1103
SYSCON-SERVO C.B.A.
CW101
CN104
TO SYSCON-SERVO C.B.A. CN104
TO SYSCON-SERVO C.B.A. CN105
CN302
AB PULSE
FE ON Ⓛ
PB Ⓗ /EE Ⓛ
UNREG 6V
CN301
AV ON Ⓛ
IC303 LVC556
REGULATE CONT.
EXT BASE DRIVE
Q318
VIDEO 5V DRIVE
TP306 VIDEO 5V
(PB5V)
Q319
Q320
(VIDEO 5V)
VR306
VIDEO 5V
(REC)
FOCUS LENS
ZOOM LENS
IRIS UNIT
RELAY LENS
CCD
PROCESS C.B.A.
CN2102
CN2106
CN310
CAMERA (Y)
CAMERA (C)
Q352
TITLE/DATE EDGE EMPHA.
Q350
TITLE/DATE MIX
Q383
BUFFER
IC304 CXA1230AR
IC308 μPD6144AG601
S-CLOCK
CG2-STROBE
S-DATA
JOG VD
V-MUTE Ⓗ
S-DATA IN
V-BLK
OSC IN
OSC OUT
VD
HD
CLOCK OUT
CG2 OUT
TP304 N.W CLIP
VIDEO 5V
VR309 Y AGC
FM MODULATOR
AGC DET
CLAMP
SYNC SEP
AGC AMP
REC
PB
TO HEAD AMP C.B.A.
TO LINE OUT
(H.SW-P)
VR310 Y CAR.
1/2fH SHIFT
FM DE-MODULATOR
MAIN EMPHA
LIMITTER
NON-LINEAR EMPHA/ DE-EMPHA
D.O. DET
MAIN DE-EMPHA
RF AGC
VR312 Y DEV.
CRT
DEFLECTION YOKE
EVF C.B.A.
CN2902
CW2901
HD-VD
CN2901
RECORDER-KEY 1 C.B.A.
CN007
CN006
CN311
EVF HD
EVF VD
EVF VIDEO
(PTMG)
VIDEO 5V
(D.O.P.)
Q344
Q372
VC301 C.G. FREQU-ENCY
D303
CAMERA-KEY C.B.A.
CN2502
PROCESS C.B.A.
CN2108
CN2105
AUTO FOCUS C.B.A.
CN2602
CN2601
CN306
AF ZONE
(V-MUTE Ⓗ)
Q317
IC310 TC7SU04F
TO SYSCON-SERVO C.B.A. CN105
CN301
CG1-CLOCK
CG1-STROBE
CG1-DATA
DISPLAY Ⓛ
CG1-DATA IN
CG1 OUT
IC307 μPD6145G101
VIDEO 5V
Q354 1/2
Q385
BUFFER
Q348
(V-MUTE Ⓗ)
D314
Q384 2/2
IC309 LVA522F2
TO LINE OUT
TO CHROMA C.B.A.
(PB5V)
TERMINAL C.B.A.
AUDIO OUT (LEFT)
AUDIO OUT (RIGHT)
EDIT OFF ON
CN1201
EDIT Ⓗ
VIDEO OUT
AUDIO OUT
VIDEO OUT
CN1208
MONO
L ch OUT
R ch OUT
AUDIO C.B.A.
CN808
CN805
FADE Ⓗ
TO CAMERA-KEY C.B.A. CN2501
CN802
A-MUTE Ⓗ
PB Ⓗ /EE Ⓛ
CAMERA Ⓗ /LINE Ⓛ
TO SYSCON-SERVO C.B.A. CN109
CN313
EDIT SW Ⓛ
VIDEO OUT
(EDIT SW Ⓛ)
CLAMP
Q355
Q357
COLOR KILLER
LEVEL DETECT
Q356
PHONE C.B.A.
CW1302
L ch
R ch
GND
CN807
HEAD PHONE AMP
POWER MUTING
UNREG 6V
S56V
VIDEO 5V
AUDIO 5V
IN/OUT SW
(CAMERA Ⓗ /LINE Ⓛ)
LIMIT CONLROL
MATRIX
L-R
L+R
15KHz L.P.F.
FM 1.7MHz
FM 1.5MHz
(A-MUTE Ⓗ)
(PB Ⓗ)
MIX
MM-200
SW.
CW1401
AUDIO 5V
CN809
AUDIO 5V
LIMITTER
MIC AMP
CN803
FADE
(FADE Ⓗ)
1.7MHz B.P.F.
1.5MHz B.P.F.
CN801
REC AUDIO
PB-RF
CN1401
MIC C.B.A.
CN301
SP Ⓗ /LP Ⓛ
(SP Ⓗ /LP Ⓛ)
CN312
CN302
REC ATF
HIB DET Ⓗ
TO SYSCON-SERVO C.B.A. CN104

01 Jun. 1989


VIDEO C.B.A.
HEAD AMP
CHROMA C
TO SYSCON-SERVO C.B.A. CN104
SYSCON-SERVO C.B.A.
CW101
CN104
TO SYSCON-SERVO C.B.A. CN105
PROCESS C.B.A.
CN2102
CN2108
RECORDER-KEY 1 C.B.A.
CN007
CN006
AUTO FOCUS C.B.A.
CN2802
CN2801
TO SYSCON-SERVO C.B.A. CN105
TO CAMERA-KEY C.B.A. CN2501
TO SYSCON-SERVO C.B.A. CN109
TO SYSCON-SERVO C.B.A. CN105
TO SYSCON-SERVO C.B.A. CN104
CN302
AB PULSE
FE ON
PB /EE
UNREG 5V
CN301
AV ON
CN310
CAMERA (Y)
CAMERA (C)
S-CLOCK
CG2-STROBE
S-DATA
JOG VD
V-MUTE
CN311
EVF HD
EVF VD
EVF VIDEO
CN306
AF ZONE
CG1-CLOCK
CG1-STROBE
CG1-DATA
DISPLAY
CN313
EDIT SW
VIDEO OUT
SP /LP
PB-RF
CN312
REC AUDIO
REC ATF
HI8 DET
IC303
LVC556
REGULATE CONT.
EXT BASE DRIVE
Q318
VIDEO 5V DRIVE
VR308
VIDEO 5V
TP306 VIDEO 5V
(PB5V)
Q319
Q320
(VIDEO 5V)
Q352
TITLE/DATE EDGE EMPHA.
Q350
TITLE/DATE MIX
Q383
BUFFER
IC308
μPD6144AG601
CG2 OUT
OSC IN
OSC OUT
VD
HD
CLOCK OUT
V-BLK
S-DATA IN
(PTMG)
VIDEO 5V
(D.O.P.)
Q344
Q372
VC301
C.G. FREQUENCY
D303
(V-MUTE)
Q317
IC310
TC7SU04F
IC307
μPD6145G101
CG1-CLOCK
CG1-STROBE
CG1-DATA IN
CLOCK IN
CG1 OUT
BUFFER
Q348
CLAMP
Q355
Q357
COLOR KILLER
LEVEL DETECT
Q356
(REC)
(PB)
IC304
CXA1230AR
TP304 N.W CLIP
VR309
Y AGC
(H.SW-P)
VR310
Y CAR.
VR312
Y DEV.
FM MODULATOR
AGC DET
CLAMP
SYNC SEP
AGC AMP
1/2fH SHIFT
MAIN EMPHA
NON-LINEAR EMPHA/DE-EMPHA
FM DE-MODULATOR
LIMITTER
D.O. DET
MAIN DE-EMPHA
RF AGC
(C-SYNC)
TO HEAD AMP C.B.A.
TO LINE OUT
VR311
W. CLIP
(D.O.P.)
VR313
PB Y
TP302 Y AGC
BUFFER
Q335
4.5MHz L.P.F. DELAY
FL303, 304
Q326
FL302
5MHz L.P.F.
Q323
Q322
PEAKING AMP
Q321
TP303 Y FM
FL301
1.5MHz TRAP
Q301
VR304
REC Y
Y, C, AUDIO, PILOT MIX
Q313
MO301
REC RF
PB-RF
CN702
(H-SW-PULSE)
(CH-1 'H-SW-PU
IC306
CXA1231AR
VR316
Y/C SEP C
2HDL
VL301
Y/C SEP
NO-COR
COR
TP305 Y/C SEP C
L.P.F.
L. COR DET
PB ON
REC ON
Q344
Q371
(SP /LP)
(EDIT)
Q387
PB5V
Q378
NORMAL
D.O.
CLAMP
L.P.F.
NOISE CANCELL
Q341, Q342, D307
AMP
Q340
Q339
4MHz TRAP.
VR315
1HDL
AM DET
AGC DET
AM MOD
Y. AMP
1HDL
VR307
REC 4f
VR308
REC A-FM
VR306
REC C
Q315
Q316
(P.S TIMING)
CN305
P.S TIMING
CN303
REC CHROMA
P.B CHROMA (A)
P.B CHROMA (B)
P.B CHROMA (C)
CHROMA
CN304
PB-RF (Y)
CN551
CN552
CN553
VIDEO 5V
Q354 1/2
Q385
(V-MUTE)
D314
Q354 2/2
IC311
MM1002
AMP
MIX
IC309
LVA522F2
(PB5V)
TO LINE OUT
TO CHROMA C.B.A.

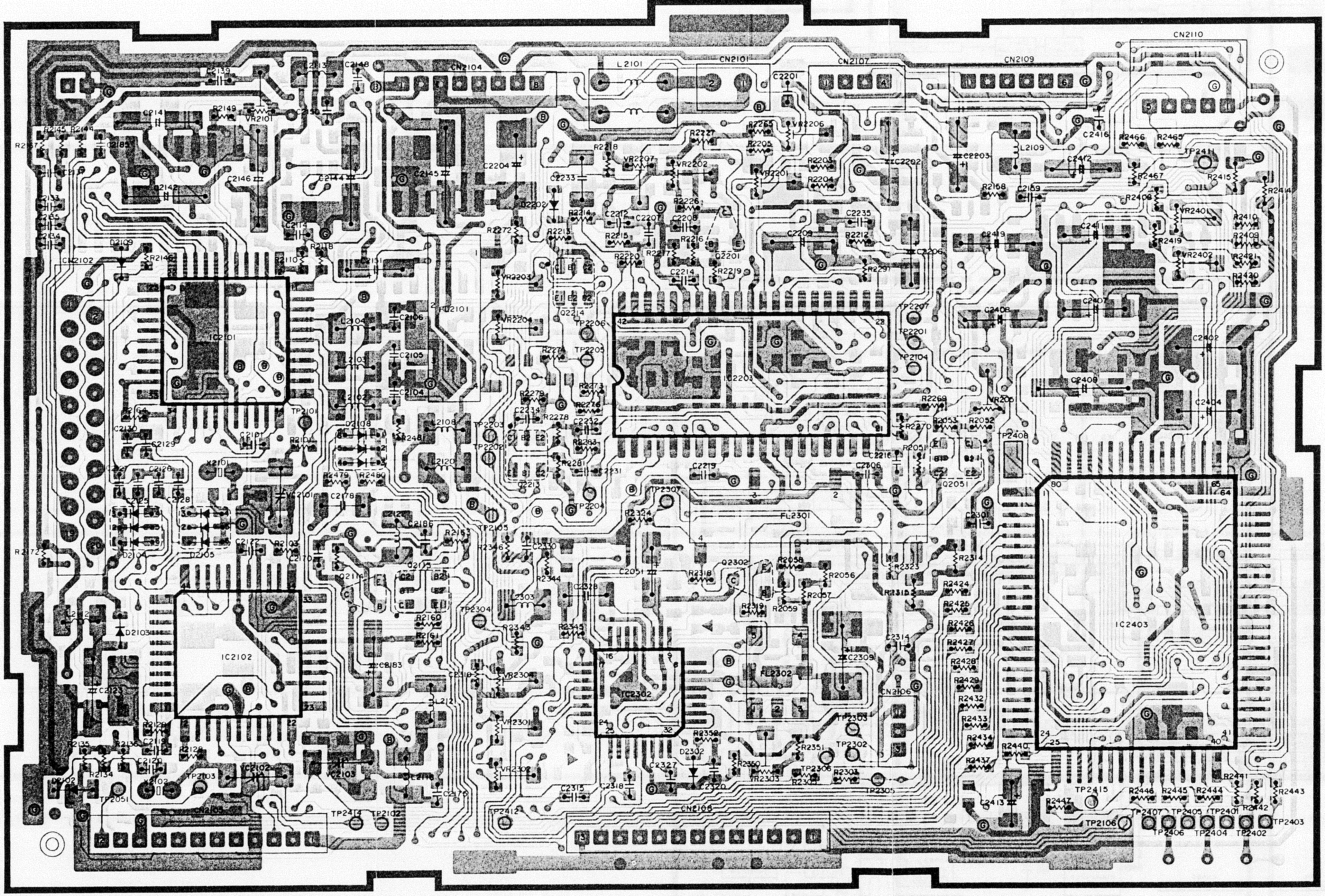

HEAD AMP C.B.A.
CHROMA C.B.A.
DRUM MOTOR
CH-1 HEAD
CH-2 HEAD
CH-1' HEAD
FE HEAD
MO301
AB PULSE
FE ON
REC RF
PB-RF
CN702
CN701
FE HEAD
CH-1
CH-2
CH-1'
OSC
2nd RF AMP
CH-1 HEAD AMP
BUFFER
CH-1 REC AMP
CH-2 REC AMP
CH-2 HEAD AMP
CH-1' HEAD AMP
AMP
(H-SW-PULSE)
(CH-1'H-SW-PULSE)
TP701 REC CURRENT
FL301
1.8MHz TRAP
Q301
BUFFER
VR304
REC Y
Y, C, AUDIO, PILOT MIX
Q313
(REC)
(PB)
TP305 Y/C SEP C
NO-COR
COR
VR307 REC 4f
VR308 REC A-FM
VR305 REC C
L.P.F.
L. COR DET
PB ON
REC ON
NORMAL
D.O.
4MHz TRAP.
AM DET
AGC DET
AM MOD
Y. AMP
1HDL
VIDEO 5V
VR315
Q316
Q318
CN305
P.S TIMING
CN303
REC CHROMA
P.B CHROMA (A)
P.B CHROMA (B)
PB-RF
P.B CHROMA (C)
CHROMA
CN304
PB-RF (Y)
SP (H) /LP (L)
CN551
CN552
CN553
(JOG VD)
(PB 5V)
(BURST FLAG)
SWITCH CONTROL
MAIN SWITCH
(1/2fH)
90° PHASE SHIFT
VIDEO 5V
G.C.A.
VR553
B.M.
SEQ. DET
(SQ. DET. P.)
BURST ID DET
(BURST ID)
TP557 VCO
VIDEO 5V
(H SYNC)
AFC DET
VCO
VR554 VCO
P.S. TIMING
(SQ. DET. P.)
4.43MHz B.P.F.
FAST ACC
PEAK HOLD
JOG ON
PB ACK
DC AMP & CH HOLD
CHROMA DE EMPHASIS
CHROMA EMPHASIS
732KHz B.P.F.
VR551 BM
ACC
TP555 C-EMPHA
VL551 C-EMPHA
BURST EMPHASIS
BURST DE EMPHASIS
CHROMA CONVERTER
APC DET.
REC ACK
H.P.F.
EQUALIZER
4.43MHz X'TAL OSC
CARRIER CONVERTER
5.17MHz B.P.F.
3.7MHz B.P.F.
90° PHASE SHIFT
TP552 V.C.O.
P.S.
(SQ. DET. P.)
VC551 SC
TP553 4.43MHz
VR552 V.C.O.
375fH VCO
1/8 1/375
CARRIER INVERTER
(BURST ID)
APC ID DET
AFC DET.
AFC ID DET.
(H-SYNC)
REC
PB

© CANON INC. 1989

CIRCUIT BOARD DIAGRAM PROCESS C.B.A.

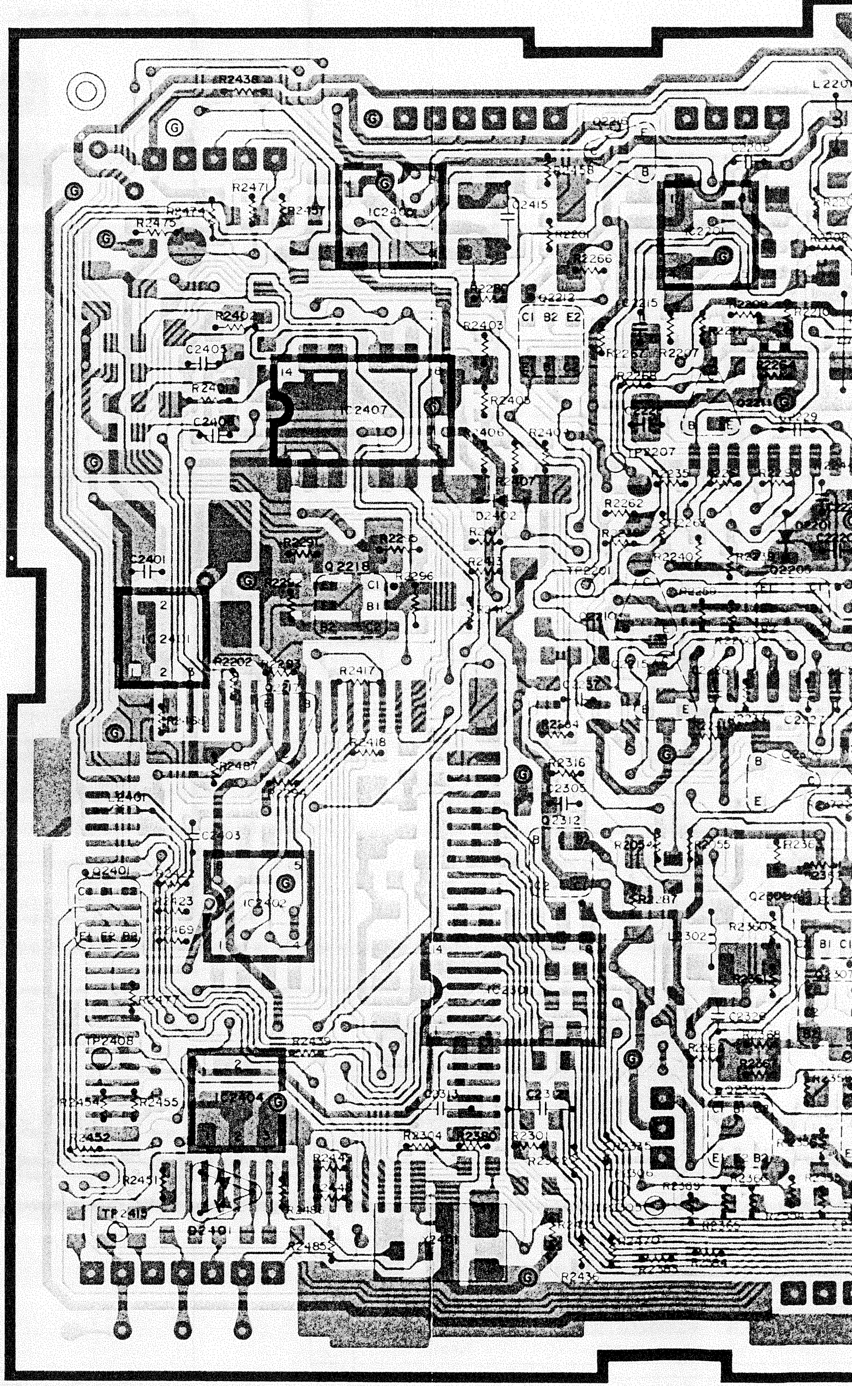
< NOTICE >
Process C. B. A. consists of four layers.
(Soldering, Component, Ground and Camera 5V patterns.)
※Through-hole marks on each C. B. A. denote :
○ : Soldering side ⟷ Component side
Ⓖ : Soldering side (Component side) ⟷ Ground
Ⓑ : Soldering side (Component side) ⟷ Camera 5V

PROCESS C.B.A. (COMPONENT SIDE)

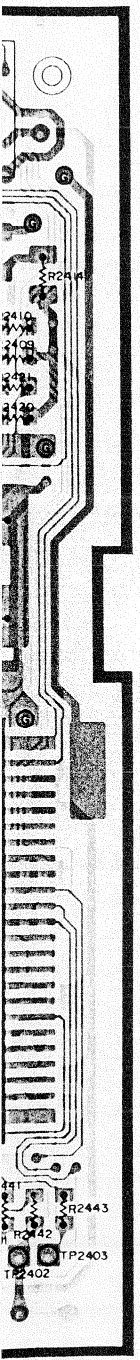


IC2101
IC2102
IC2201
IC2302
IC2403
CN2101
CN2104
CN2107
CN2108
CN2109
CN2110
L2101
FL2301
FL2302

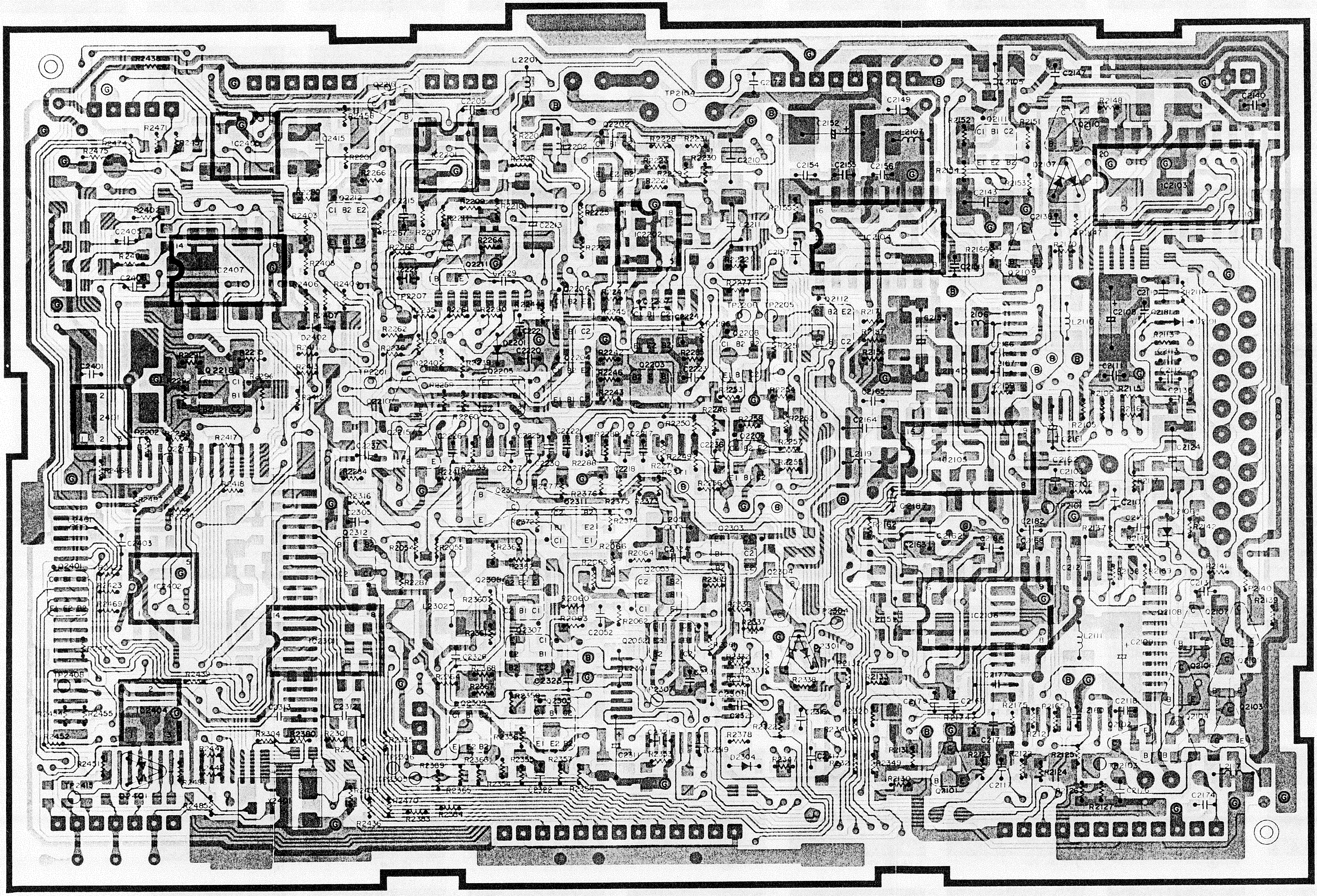
PROCESS C.B.A. (SOLDERING SI



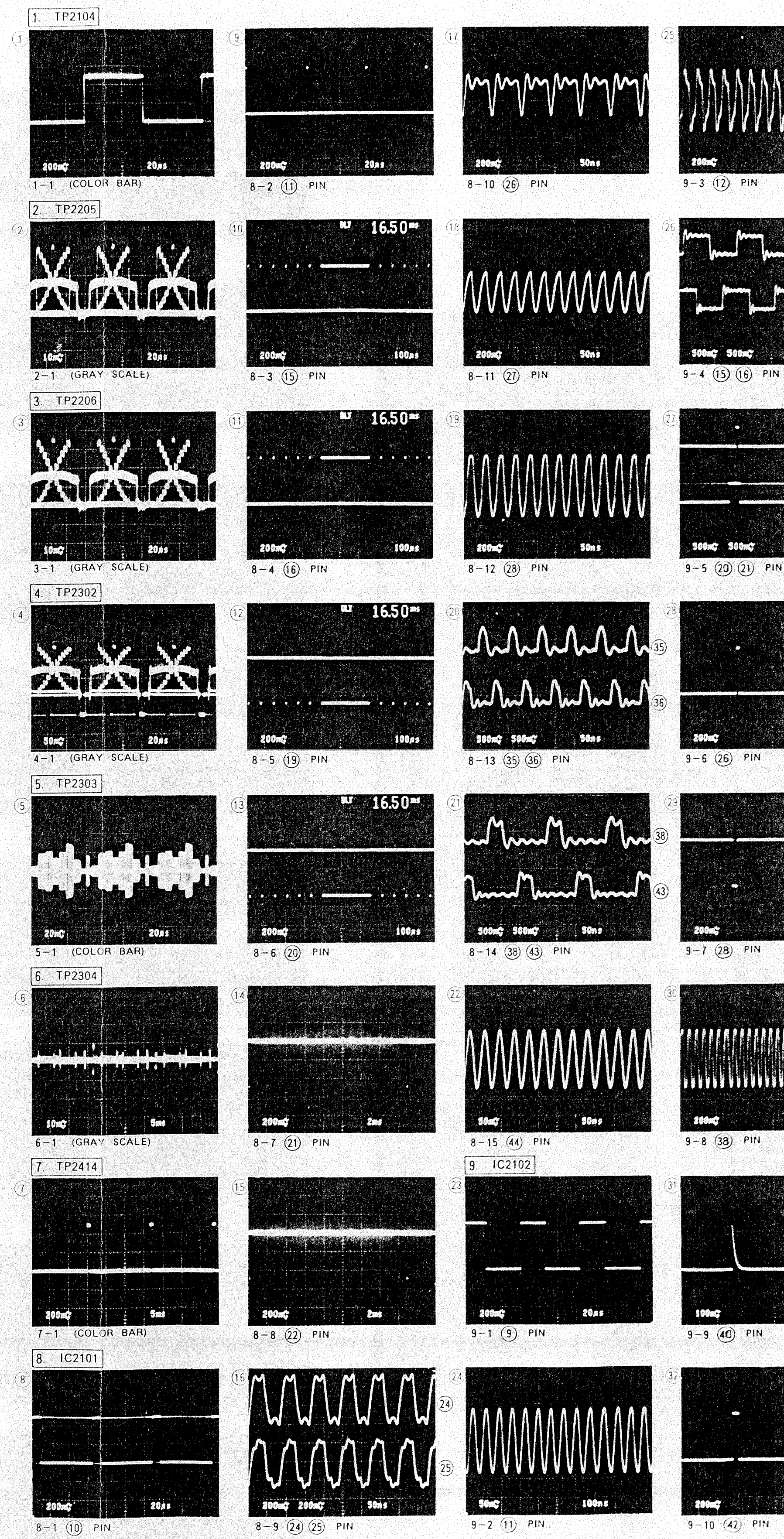
.)

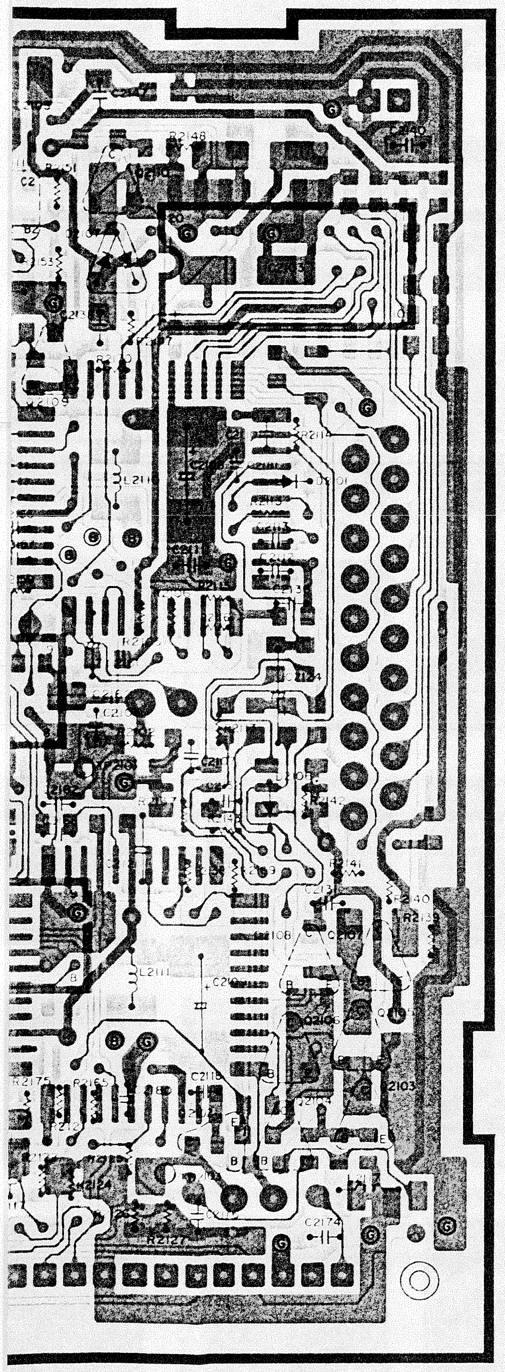

R2444
R2443
R2442
TP2402
TP2403

PROCESS C.B.A. (SOLDERING SIDE)

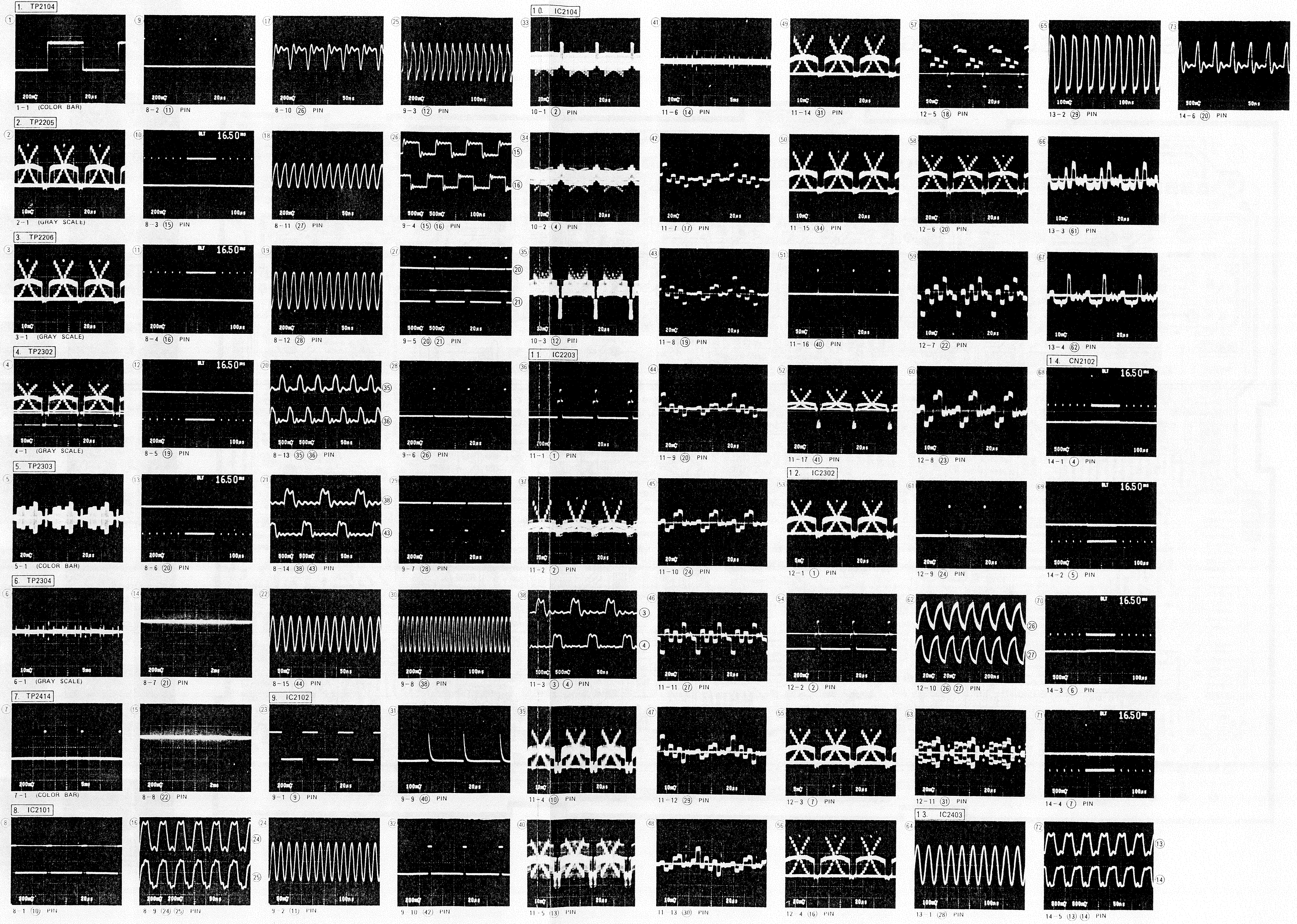

L2201
TP2104
IC2407
IC2401
IC2402
IC2102
IC2103
IC2104
IC2105
IC2101
IC2202
IC2301
IC2404
Q2203
Q2211
Q2303
Q2305
Q2308
TP2201
TP2205
TP2206
TP2207
C2149
C2152
C2154
C2155
C2156
C2164
R2417
R2418
R2455

SIGNAL WAVE





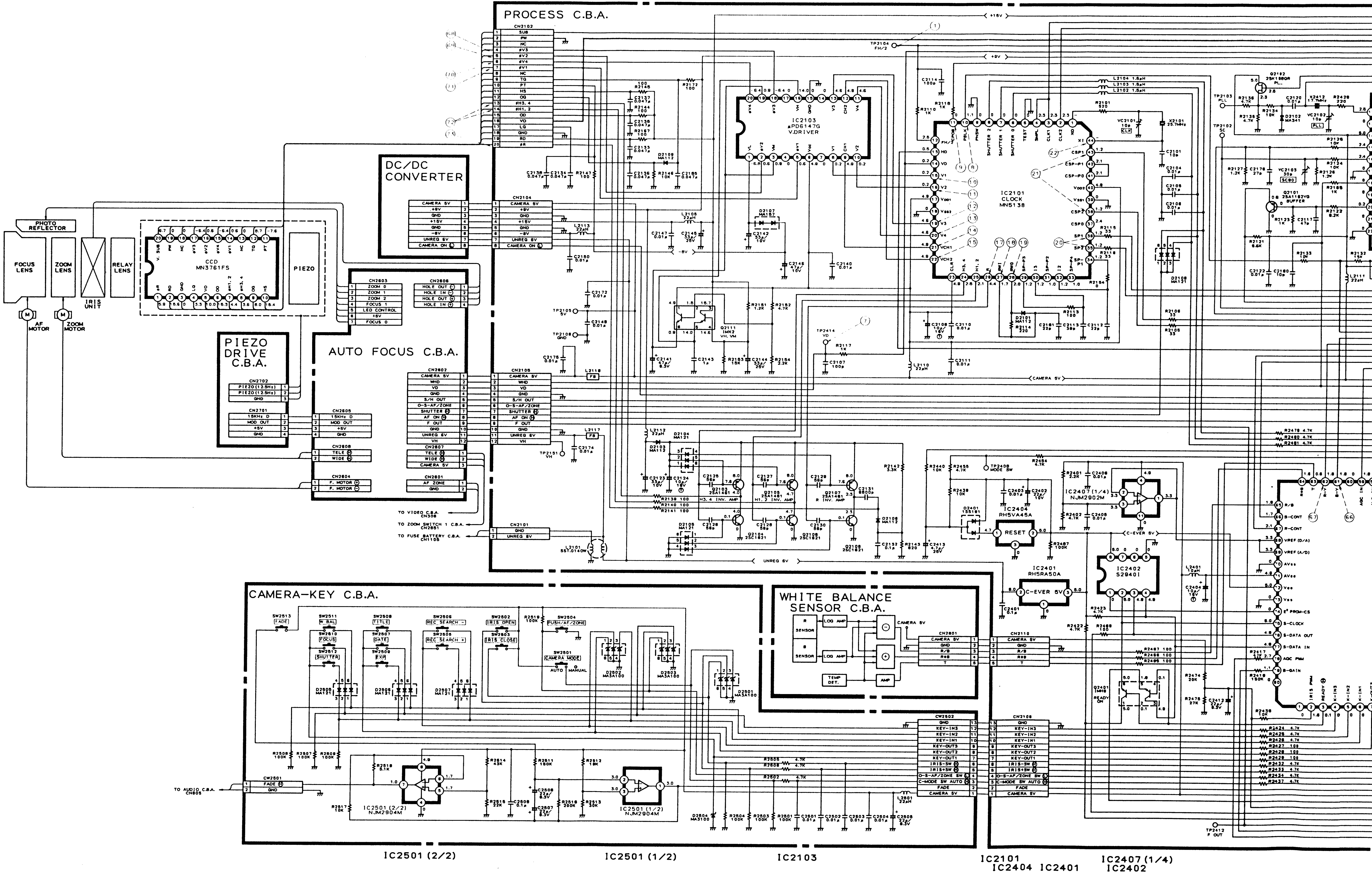
SIGNAL WAVE



© CANON INC. 1989

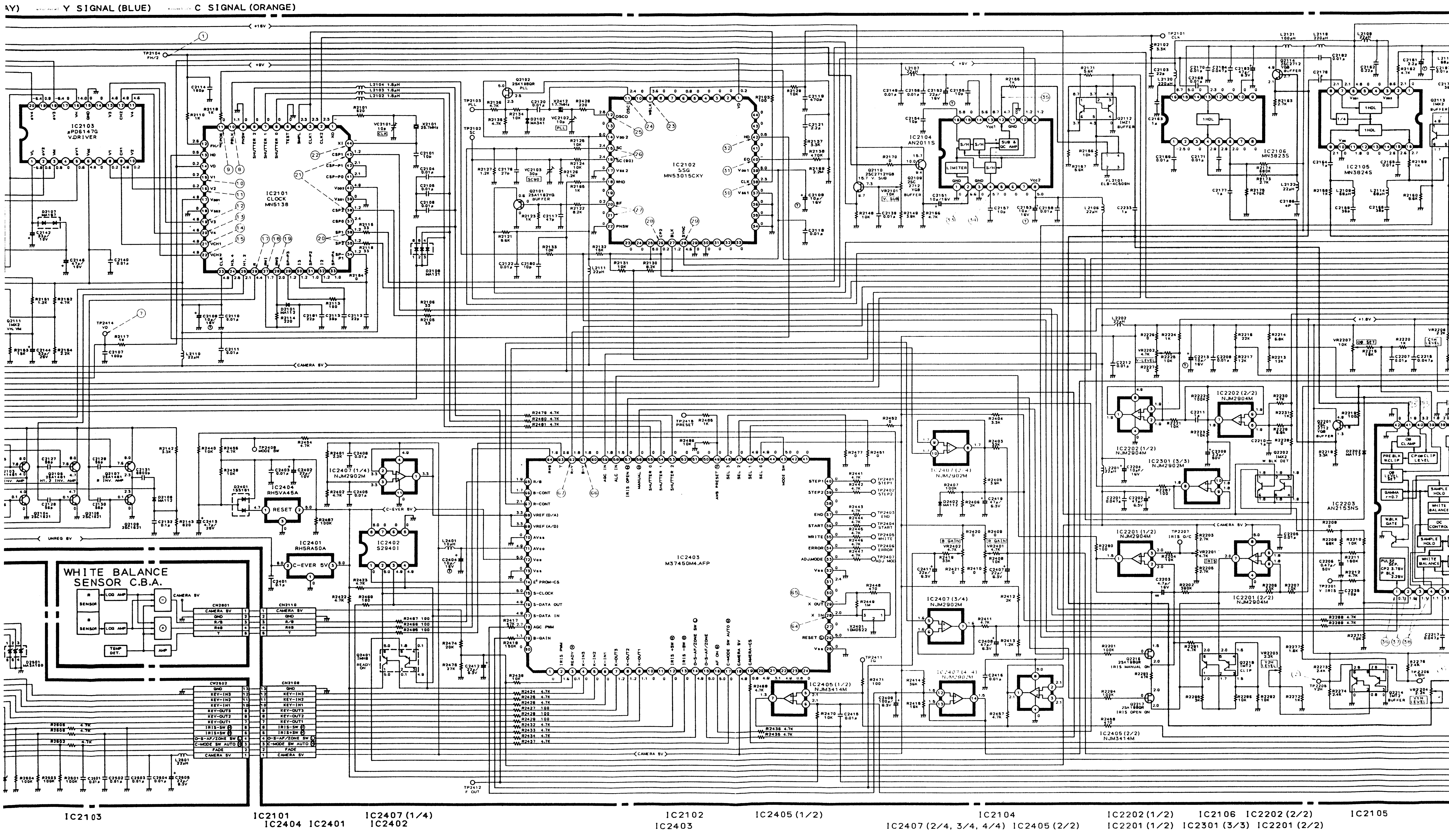
SCHEMATIC DIAGRAM PROCESS • CAMERA-KEY C.B.A.

•SIGNAL PATH Y+C SIGNAL (GRAY) Y SIGNAL (BLUE) C SIGNAL (ORANGE)

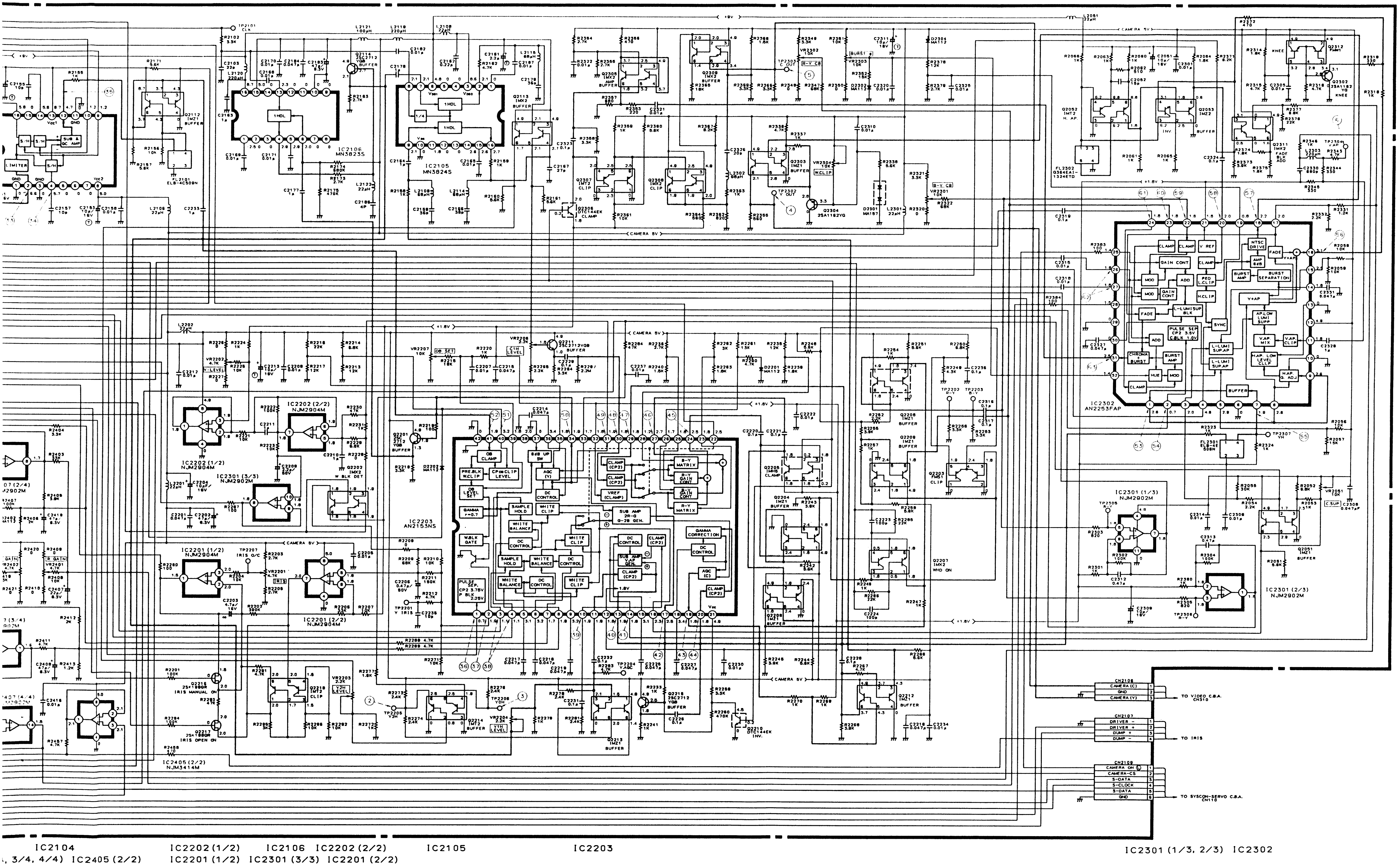


PROCESS C.B.A.
CN2102
DC/DC CONVERTER
CN2104
PHOTO REFLECTOR
FOCUS LENS
ZOOM LENS
IRIS UNIT
RELAY LENS
CCD MN3761FS
PIEZO
AF MOTOR
ZOOM MOTOR
PIEZO DRIVE C.B.A.
CN2702
CN2701
AUTO FOCUS C.B.A.
CN2603
CN2608
CN2602
CN2605
CN2606
CN2607
CN2604
CN2601
CN2105
CN2101
TO VIDEO C.B.A. CN306
TO ZOOM SWITCH 1 C.B.A. CN2851
TO FUSE BATTERY C.B.A. CN1108
IC2103 μPD6147G V.DRIVER
IC2101 CLOCK MN5138
IC2404 RH5VA45A
RESET
IC2407 (1/4) NJM2902M
IC2401 RH5RA50A
C-EVER 5V
IC2402 S29401
CAMERA-KEY C.B.A.
WHITE BALANCE SENSOR C.B.A.
CN2801
CN2110
CN2502
CN2106
CN2501
TO AUDIO C.B.A. CN805
IC2501 (2/2) NJM2904M
IC2501 (1/2) NJM2904M
IC2501 (2/2)
IC2501 (1/2)
IC2103
IC2101
IC2404 IC2401
IC2407 (1/4)
IC2402

01 Jun. 1989



AY)
Y SIGNAL (BLUE)
C SIGNAL (ORANGE)
+16V
+8V
+9V
+1.8V
CAMERA 5V
UNREG 5V
C-EVER 5V
IC2103 μPD5147G V.DRIVER
IC2101 CLOCK MN5138
IC2102 SSG MN53015CXY
IC2104 AN2011S
IC2106 MN3823S
IC2105 MN3824S
IC2403 M37450M4.AFP
IC2404 RH5VA45A
RESET
IC2401 RH5RA50A
C-EVER 5V
IC2402 S29401
IC2407 (1/4) NJM2902M
IC2407 (2/4) NJM2902M
IC2407 (3/4) NJM2902M
IC2407 (4/4) NJM2902M
IC2405 (1/2) NJM3414M
IC2405 (2/2) NJM3414M
IC2202 (1/2) NJM2904M
IC2202 (2/2) NJM2904M
IC2201 (1/2) NJM2904M
IC2201 (2/2) NJM2904M
IC2301 (3/3) NJM2902M
IC2203 AN2153NS
Q2102 2SK108QR PLL
Q2101 2SA1162YG BUFFER
Q2110 2SC2712YGB V. SUB
Q2109 2SC2712 YGB BUFFER
Q2114 2SC2712 YGB BUFFER
Q2113 IMX2 BUFFER
Q2117 IMZ1 BUFFER
Q2201 2SC2712 YGB BUFFER
Q2214 IMZ2 BUFFER
Q2216 2SK108QR IRIS MANUAL ON
Q2217 2SK108QR IRIS OPEN ON
Q2218 IMZ2 CLIP
Q2202 IMX2 W BLK DET
Q2401 IMH8 READY ON
FL2101 ELB-4C509N
X2101 28.7MHz
X2401 10M0522
X2412 17.7MHz
LIMITER
S/H
SUB & OC AMP
1HDL
OB CLAMP
PRE BLK WCL IP
CP OB CLIP LEVEL
OB LEVEL SET
GAMMA r=0.7
W.BLK GATE
SAMPLE HOLD
WHITE BALANCE
DC CONTROL
PULSE SEP. CP2 3.78V P BLK 2.28V
WHITE BALANCE SENSOR C.B.A.
R SENSOR
B SENSOR
LOG AMP
TEMP DET.
AMP
CAMERA 5V
CN2801
CN2110
GND
R/B
R+B
T
CN2502
CN3108
KEY-IN3
KEY-IN2
KEY-IN1
KEY-OUT3
KEY-OUT2
KEY-OUT1
IRIS-SW ⊖
IRIS+SW ⊕
O-S-AF/ZONE SW ⊕
C-MODE SW AUTO ⊕
FADE
TP2101 CLK
TP2102 SC
TP2103 PLL
TP2104 FH/2
TP2414 VD
TP2408 MODE SW
TP2418 PRESET
TP2401 STEP1
TP2402 STEP2
TP2403 END
TP2404 START
TP2405 WHITE
TP2406 ERROR
TP2407 ADJ MODE
TP2411 IG
TP2412 F OUT
TP2207 IRIS O/C
TP2201 Y IRIS
TP2205 V2H
TP2206 Y1H
V. SUB
VC2101 CLK
VC2102 PLL
VC2103 SC/BO
B GAIN
R GAIN
OB SET
C1H LEVEL
V-LEVEL
V2H LEVEL
Y1H LEVEL
IC2103
IC2101 IC2404 IC2401
IC2407 (1/4) IC2402
IC2102 IC2403
IC2405 (1/2)
IC2104 IC2407 (2/4, 3/4, 4/4) IC2405 (2/2)
IC2202 (1/2) IC2201 (1/2)
IC2106 IC2301 (3/3)
IC2202 (2/2) IC2201 (2/2)
IC2105

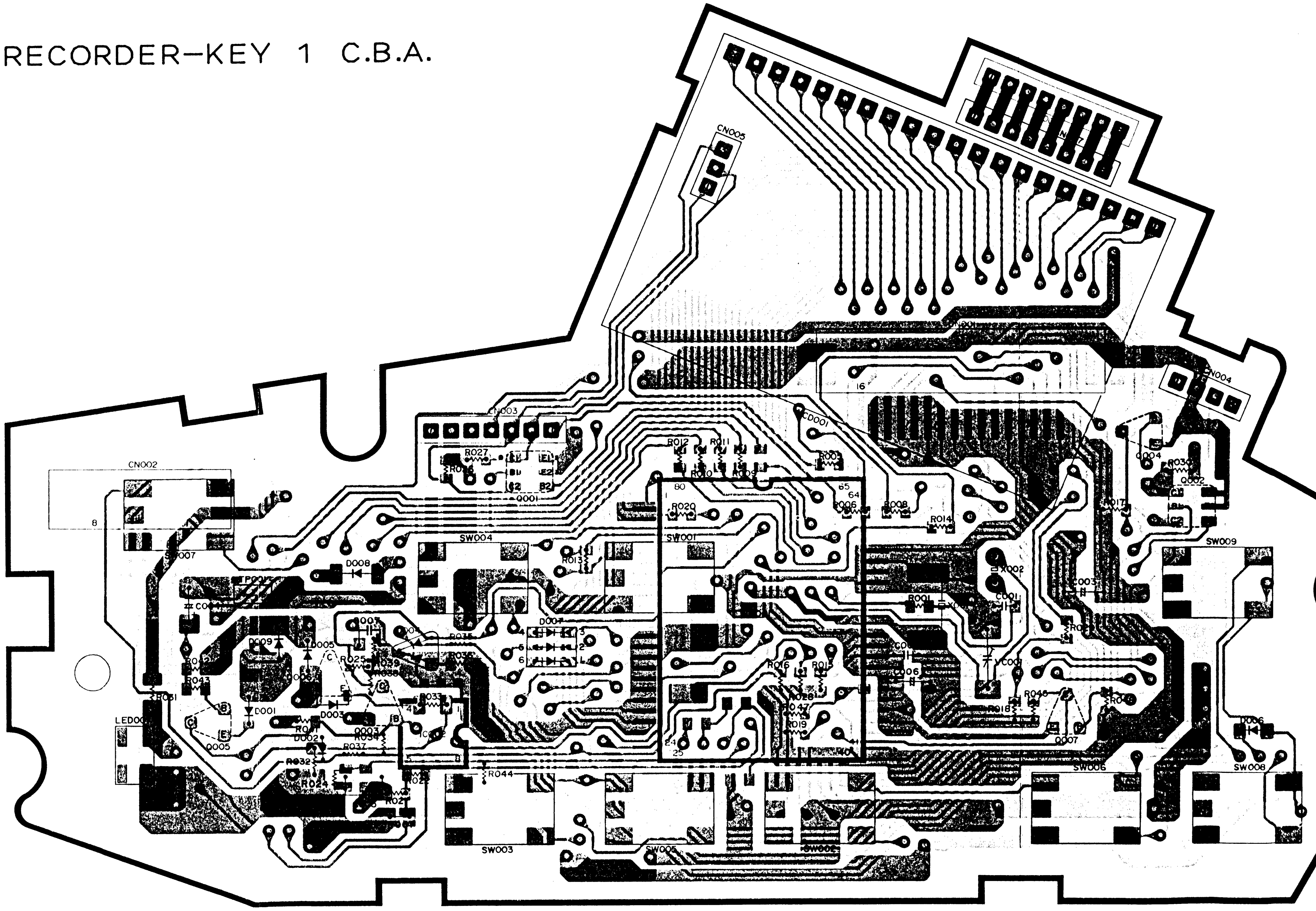

IC2106 MN3825S
IC2105 MN3824S
IC2203 AN2153NS
IC2302 AN2253FAP
IC2202 (1/2) NJM2904M
IC2202 (2/2) NJM2904M
IC2201 (1/2) NJM2904M
IC2201 (2/2) NJM2904M
IC2301 (1/3) NJM2902M
IC2301 (2/3) NJM2902M
IC2301 (3/3) NJM2902M
IC2405 (2/2) NJM3414M
FL2101 ELB-4C509N
FL2302 G364EAI-1324ETD
FL2301 ELB-4E 508N
CN2108
CAMERA (C) 1
GND 2
CAMERA (Y) 3
TO VIDEO C.B.A. CN310
CN2107
DRIVER − 1
DRIVER + 2
DUMP + 3
DUMP − 4
TO IRIS
CN2109
CAMERA ON Ⓛ 1
CAMERA-CS 2
S-DATA 3
S-CLOCK 4
S-DATA 5
GND 6
TO SYSCON-SERVO C.B.A. CN110
+8V
CAMERA 8V
+1.8V
IC2104
, 3/4, 4/4) IC2405 (2/2)
IC2202 (1/2) IC2106 IC2202 (2/2)
IC2201 (1/2) IC2301 (3/3) IC2201 (2/2)
IC2105
IC2203
IC2301 (1/3, 2/3) IC2302

© CANON INC. 1989

CIRCUIT BOARD DIAGRAM RECORDER-KEY 1 · SYSCON-SERVO C.B.A.

SYSCON–S

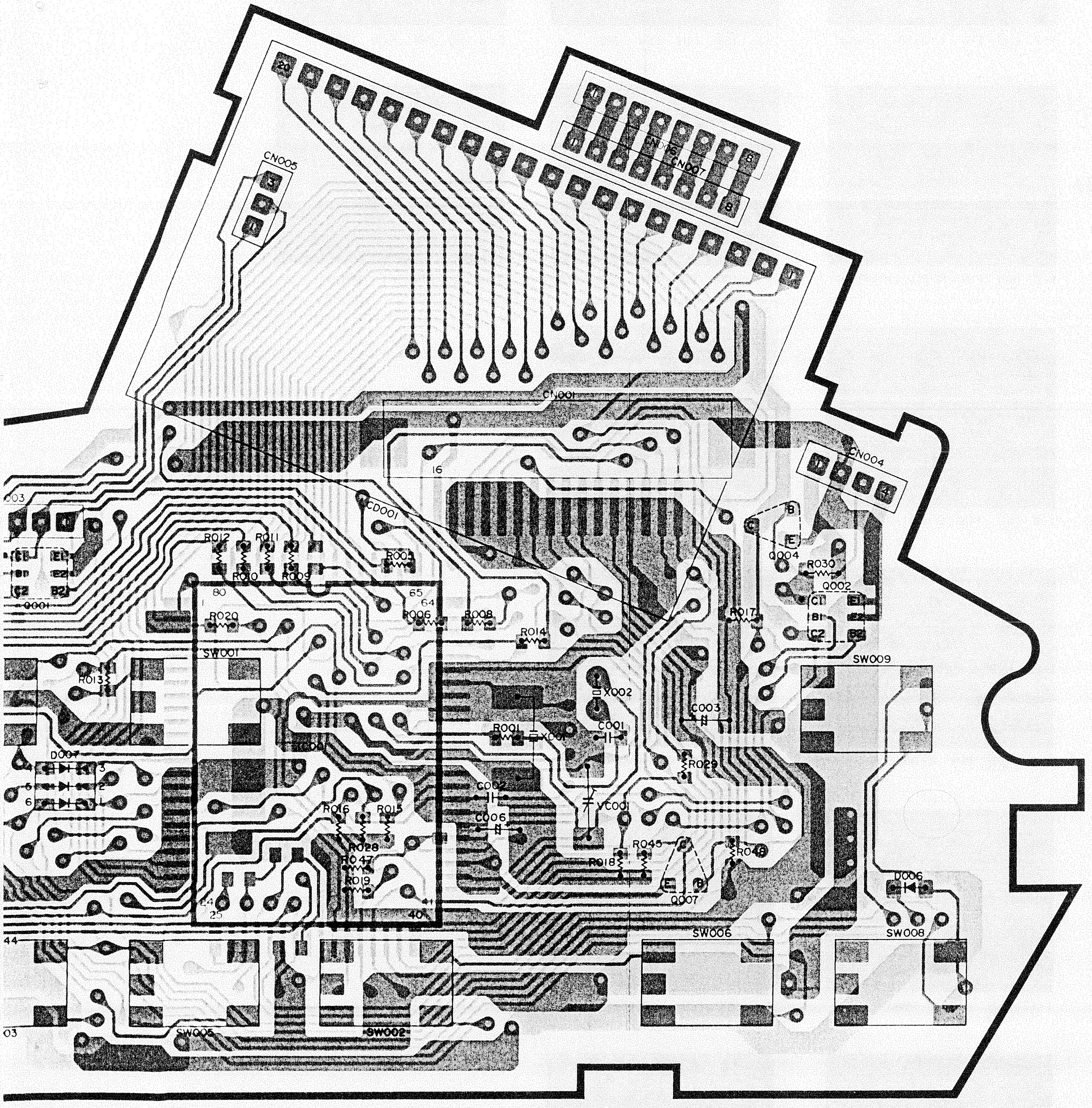
RECORDER–KEY 1 C.B.A.



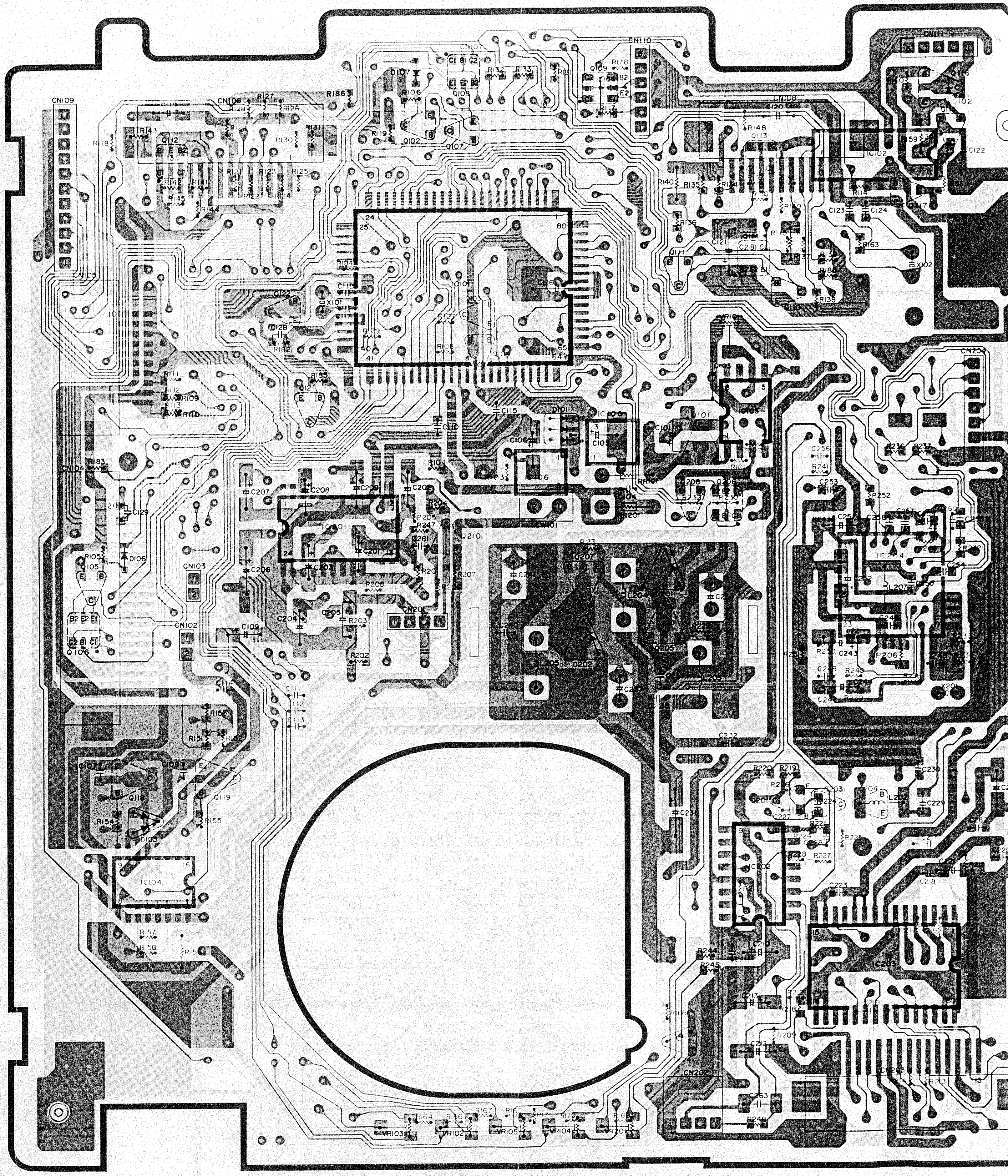
CN005
CN003
CN002
CN004
CN001
SW001
SW002
SW003
SW004
SW005
SW006
SW007
SW008
SW009
LED001
Q001
Q002
Q003
Q004
Q005
Q007
D001
D002
D003
D004
D005
D006
D007
D008
D009
X002
R001
R006
R008
R010
R011
R012
R013
R014
R015
R016
R017
R018
R019
R020
R024
R025
R027
R028
R031
R032
R034
R035
R037
R039
R042
R043
R044
R045
R047
C001
C003
C006

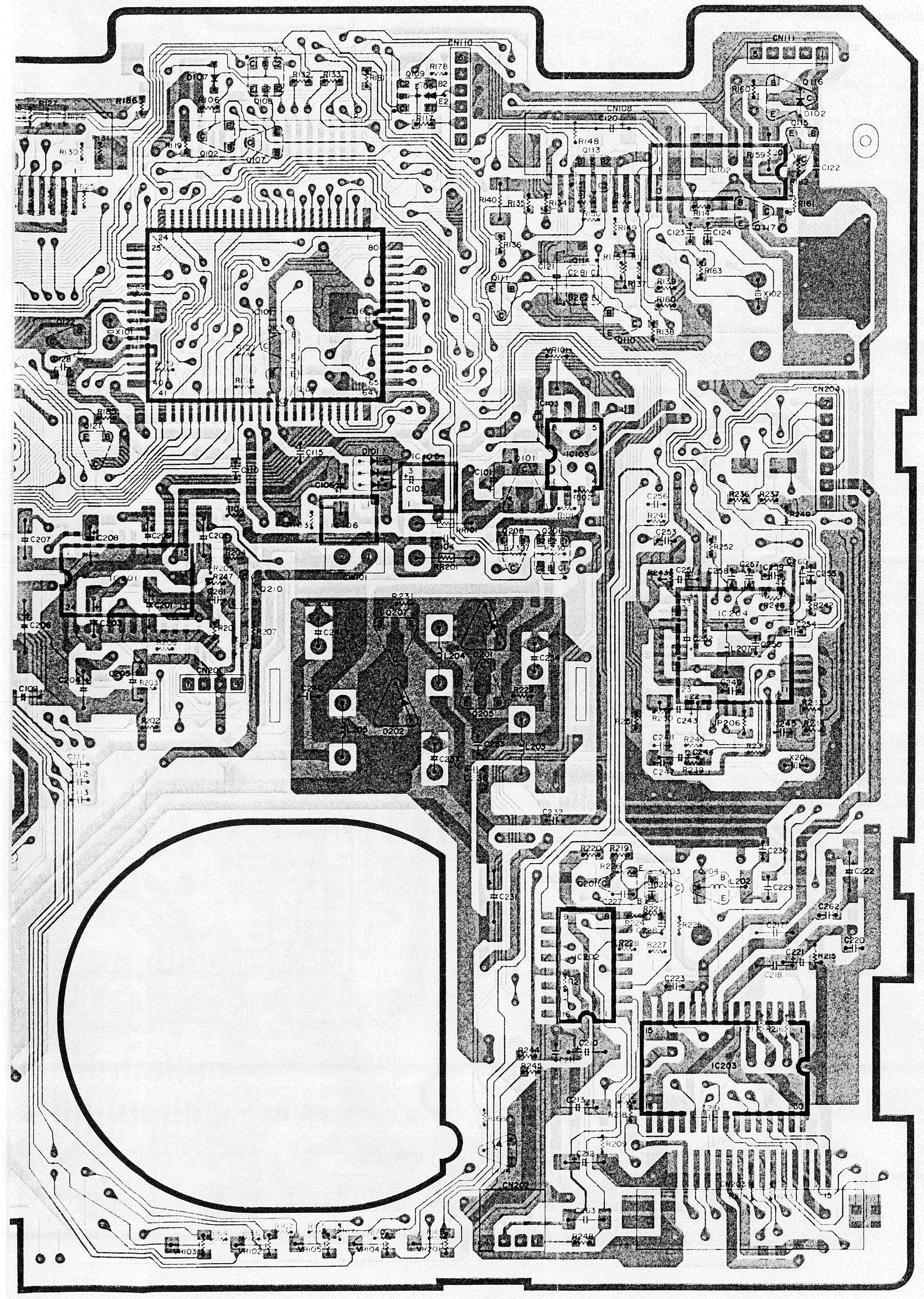
✱JP001
OPEN : PAL
SHORT : SECAM

DER-KEY 1 · SYSCON-SERVO C.B.A.


CN005
CN007
CN001
CN004
CD001
IC001
R012
R011
R010
R009
R003
R006
R008
R014
R020
R013
R016
R015
R028
R019
R017
R030
R029
R001
R018
R045
R048
X002
X001
C001
C002
C003
C006
VC001
Q001
Q002
Q004
Q007
D006
D007
SW001
SW002
SW005
SW006
SW008
SW009

SYSCON–SERVO C.B.A.

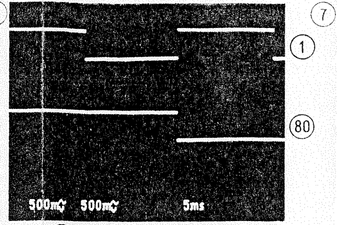

CN109
CN110
CN111
CN106
CN108
CN101
CN102
CN103
CN201
CN202
CN203
IC101
IC102
IC104
IC105
IC106
IC201
IC202
IC203
IC204
X101
X102
X201
Q101
Q102
Q106
Q107
Q108
Q109
Q110
Q112
Q113
Q119
Q122
D101
D106
D107
D201
D202
D203
D204
D205
D210
R186
R127
R124
R131
R130
R148
R140
R135
R136
R138
R163
R183
R201
R202
R203
R207
R231
R232
R235
R237
R241
R243
R244
R245
R246
C115
C121
C122
C123
C124
C128
C129
C201
C203
C204
C206
C207
C208
C209
C232
C243
C252
C253
C256
VR101
VR102
VR103
VR104
VR105



SIGNAL WAVE

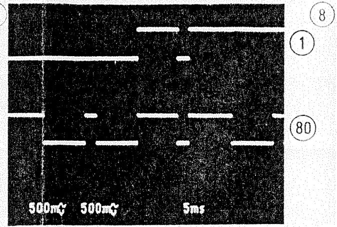
1. IC101

①



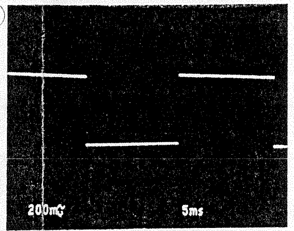
1-1 ① PIN SEL1 (REC)
(80) PIN SEL2 (REC)

②



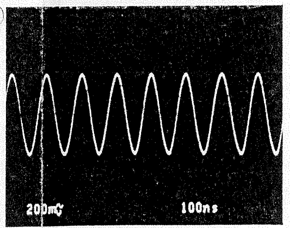
1-2 ① PIN SEL1 (PB)
(80) PIN SEL2 (PB)

③



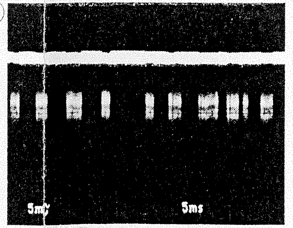
1-3 ② PIN HEAD SW PULSE (REC)

④



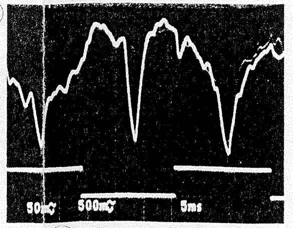
1-4 ㉟ PIN X IN (REC)

⑤



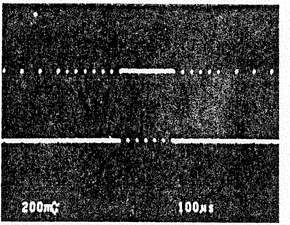
1-5 ㊸ PIN S-CLOCK (REC)

⑥



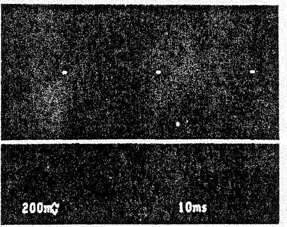
1-6 (51) PIN ATF-ERROR (PB)

⑦



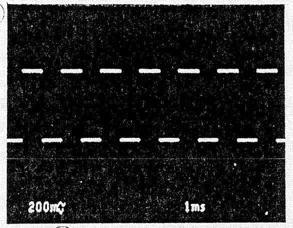
1-7 (58) PIN C-SYNC (REC)

⑧



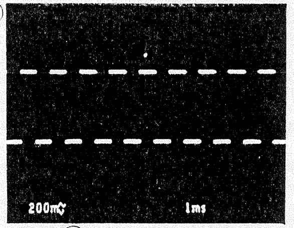
1-8 (60) PIN D-PG (REC)

⑨



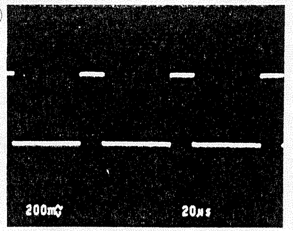
1-9 (61) PIN D-FG (REC)

⑩



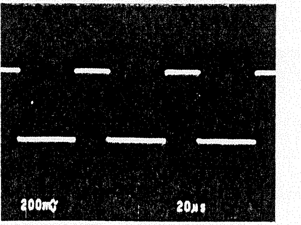
1-10 (62) PIN C-FG (REC)

⑪



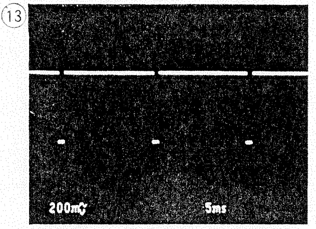
1-11 (67) PIN D-PWM (REC)

⑫



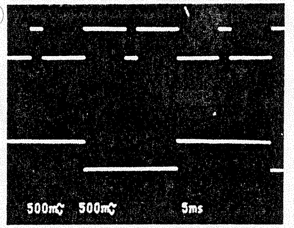
1-12 (68) PIN C-PWM (REC)

⑬



1-13 (78) PIN TSB (PB)

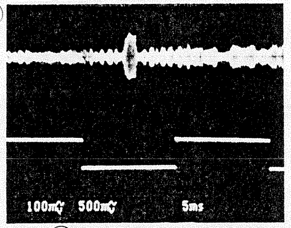
⑭



1-14 (79) PIN ATF SW (PB)

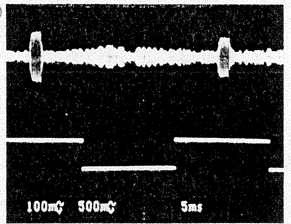
2. CN204

⑮



2-1 ⑥ PIN FH·16KHZ (PB)

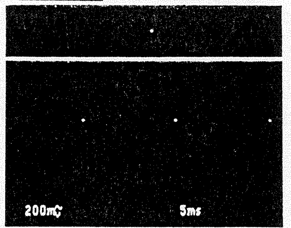
⑯



2-2 ⑦ PIN 3FH·47KHZ (PB)

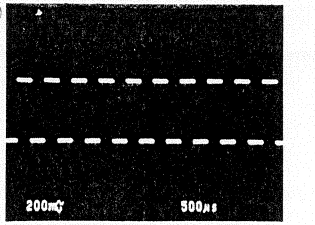
3. IC001

⑰



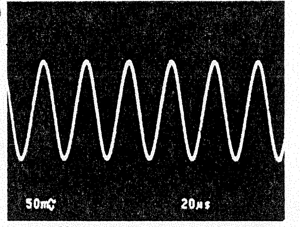
3-1 ㊴ PIN S-CLOCK (PB)

⑱



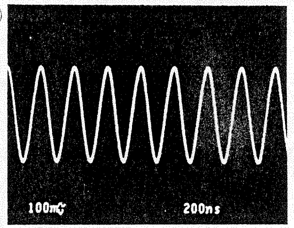
3-2 ㊾ PIN C-OOT (PB)

⑲



3-3 (55) PIN XT1 (PB)

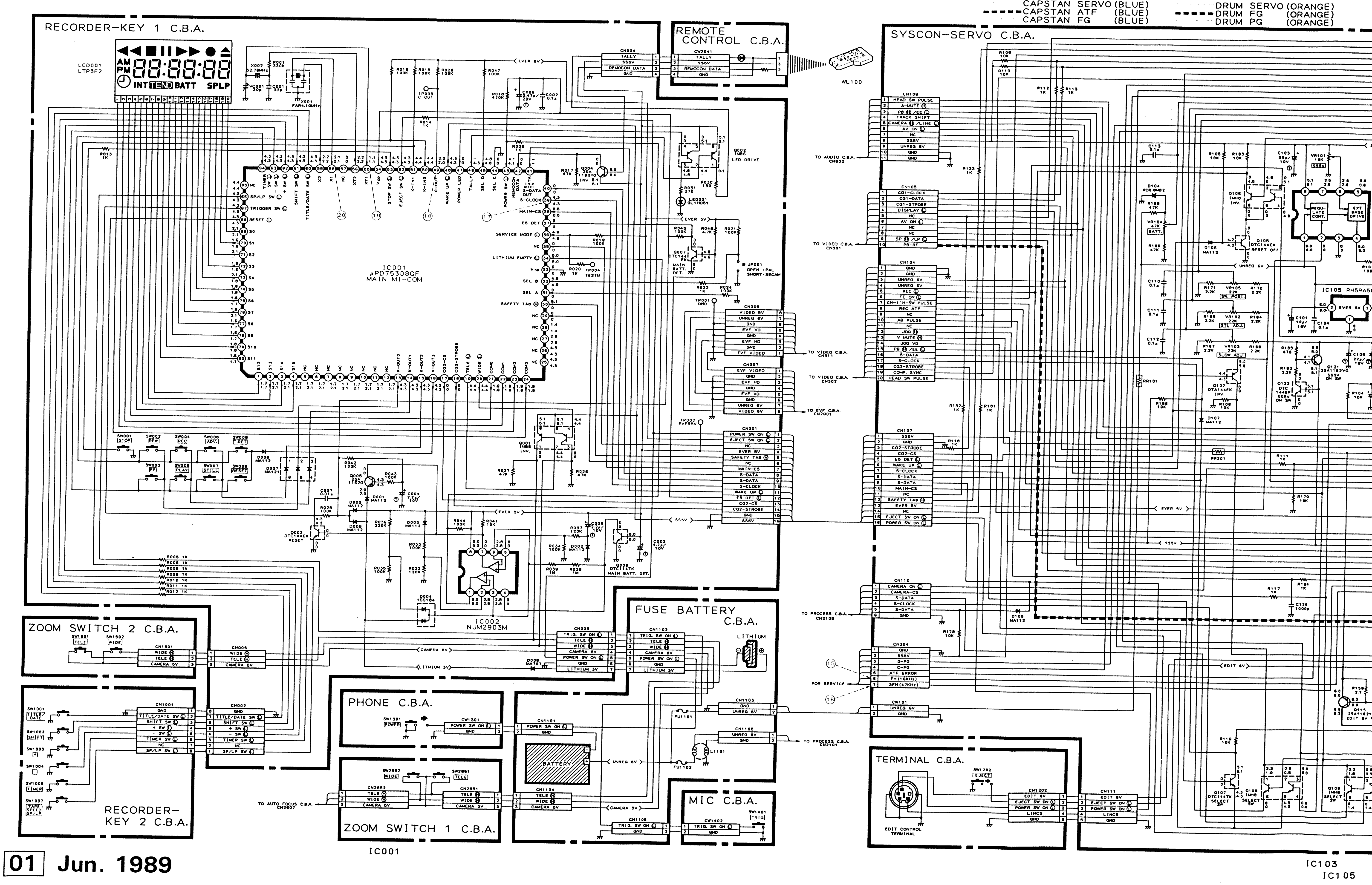
⑳



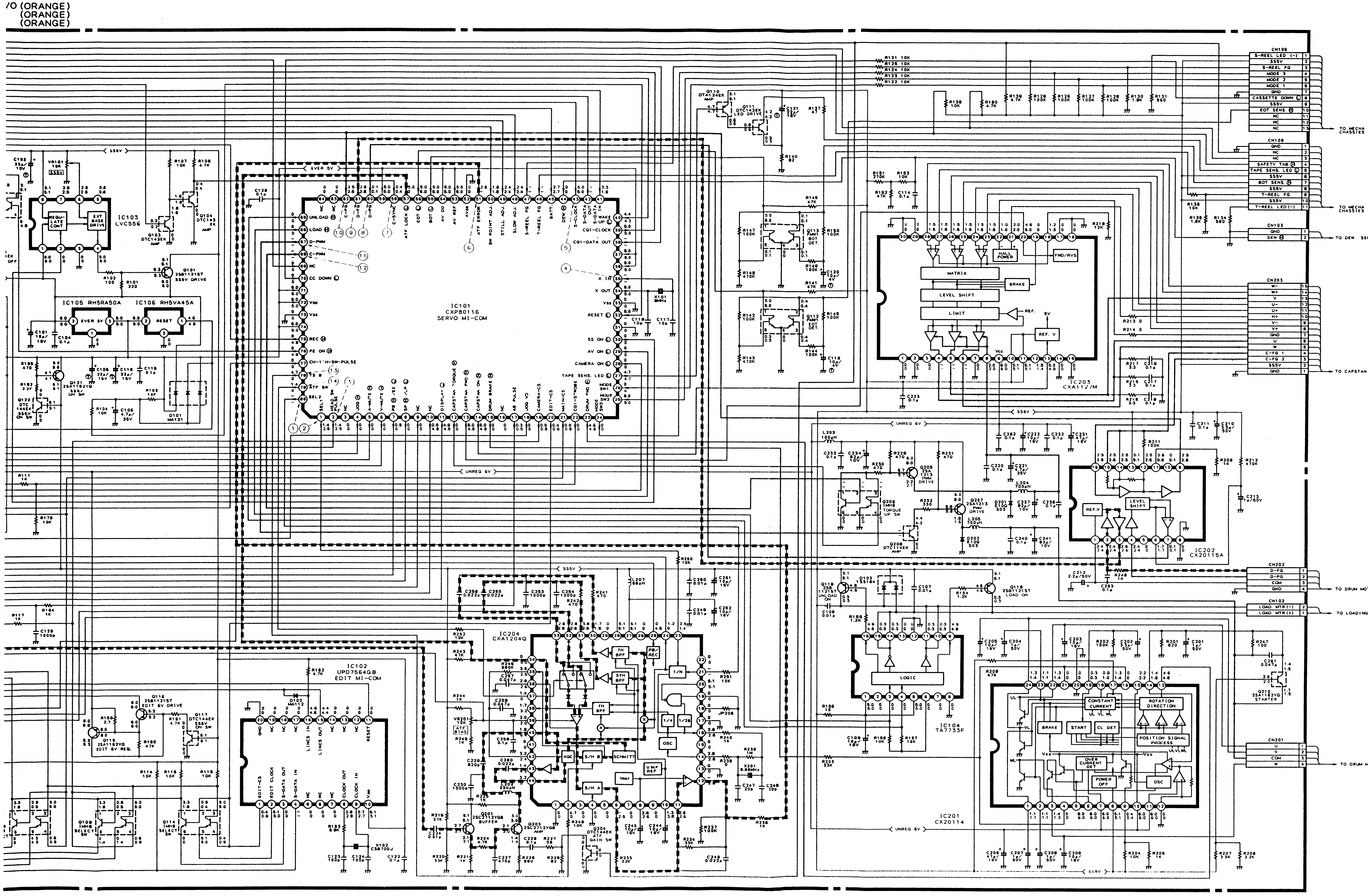
3-4 (58) PIN X1 (PB)

© CANON INC. 1989

SCHEMATIC DIAGRAM RECORDER-KEY 1 • SYSCON-SERVO C.B.A.


○SIGNAL PATH
CAPSTAN SERVO (BLUE)
CAPSTAN ATF (BLUE)
CAPSTAN FG (BLUE)
DRUM SERVO (ORANGE)
DRUM FG (ORANGE)
DRUM PG (ORANGE)
RECORDER-KEY 1 C.B.A.
REMOTE CONTROL C.B.A.
SYSCON-SERVO C.B.A.
LCD001 LTP3F2
IC001 μPD75308GF MAIN MI-COM
IC002 NJM2903M
ZOOM SWITCH 2 C.B.A.
RECORDER-KEY 2 C.B.A.
PHONE C.B.A.
ZOOM SWITCH 1 C.B.A.
FUSE BATTERY C.B.A.
LITHIUM
BATTERY
MIC C.B.A.
TERMINAL C.B.A.
EDIT CONTROL TERMINAL
WL100
IC105 RH5RA5
TO AUDIO C.B.A. CN802
TO VIDEO C.B.A. CN301
TO VIDEO C.B.A. CN311
TO VIDEO C.B.A. CN302
TO EVF C.B.A. CN2801
TO PROCESS C.B.A. CN2109
TO PROCESS C.B.A. CN2101
TO AUTO FOCUS C.B.A. CN2807
FOR SERVICE
IC001
IC103
IC105

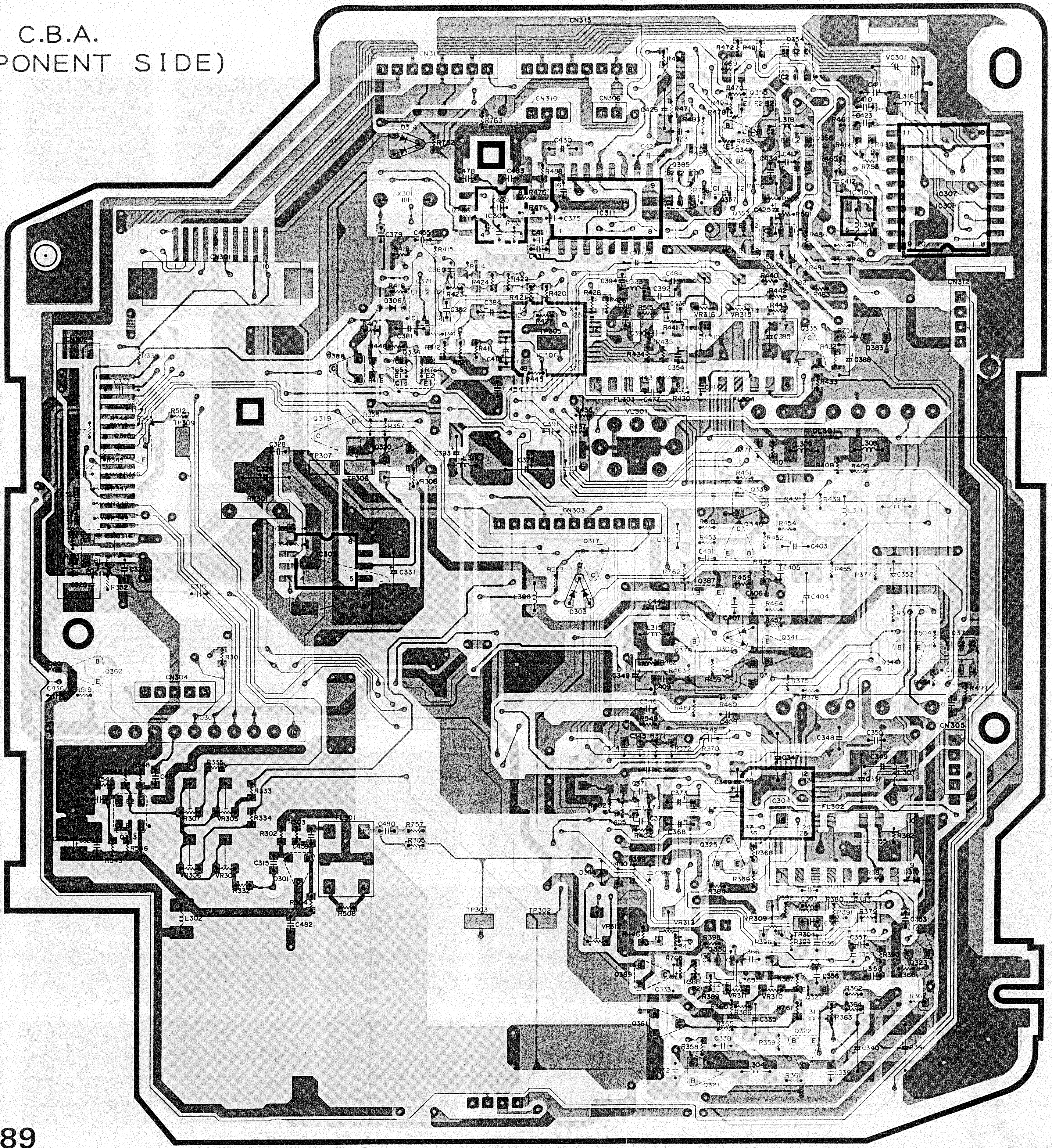
01 Jun. 1989

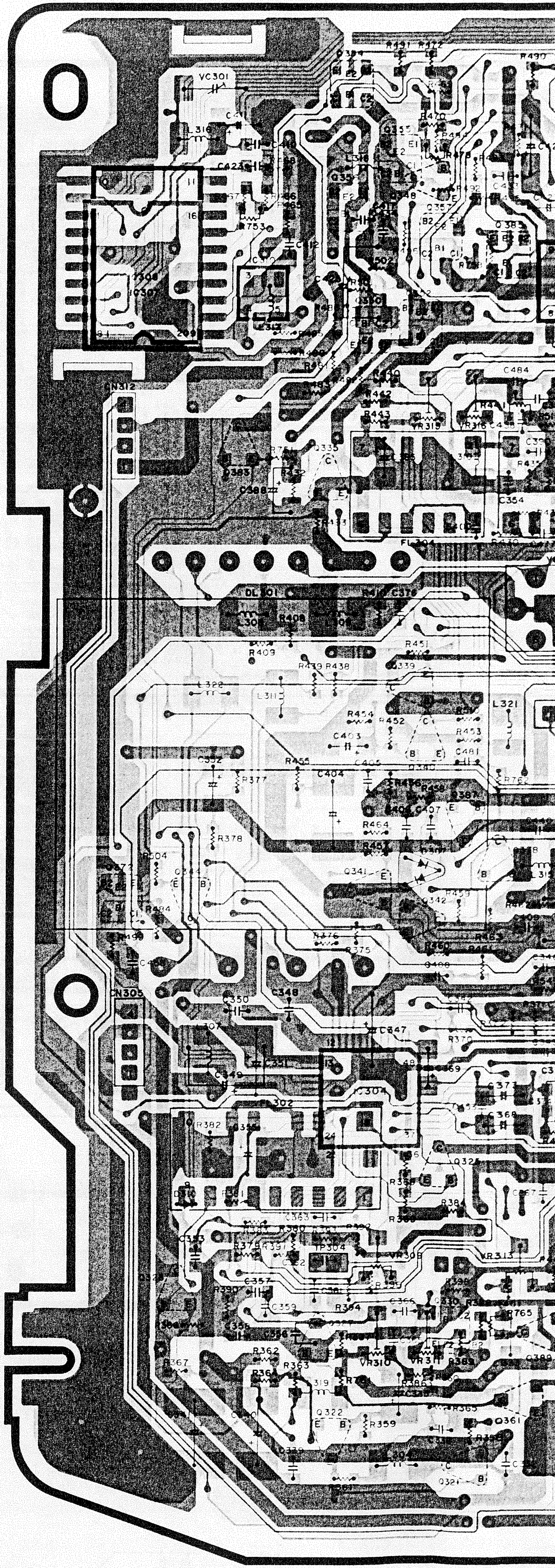

(ORANGE)
(ORANGE)
(ORANGE)
IC103 LVC556
IC105 RH5RA50A
IC106 RH5VA45A
EVER 5V
RESET
Q101 2SB1121ST S5SV DRIVE
Q103 DTC143EK AMP
Q104 DTC143EK AMP
Q121 2SA1162YQ S5SV ON SW
Q122 DTC144EK S5SV ON SW
D101 MA121
IC101 CXP80116 SERVO MI-COM
X101 8MHz
UNLOAD
LOAD
D-PWM
C-PWM
CC DOWN
REC
FE ON
CH-1'H-SW-PULSE
TS B
ATF SW
SEL2
X IN
X OUT
RESET
SS ON
AV ON
CAMERA ON
TAPE SENS. LED
MODE SW1
MODE SW2
CQ1-CLOCK
CQ1-DATA OUT
S-WAKE UP
IC102 UPD7564GB EDIT MI-COM
EDIT CLOCK
S-DATA OUT
S-DATA IN
CLOCK OUT
CLOCK IN
X102 CSB700J
Q115 2SA1162YQ EDIT 6V REG.
Q116 2SB1121ST EDIT 6V DRIVE
Q117 DTC144EK S5SV ON SW
D102 MA112
Q108 1M1B SELECT SW
Q114 1M1B SELECT SW
IC204 CXA1204Q
FH BPF
5TH BPF
PB/REC
AGC
S/H B
SCHMITT
S/H A
VREF
V BCF REF
1/N
1/4
1/28
OSC
Q201 2SC2712YQB BUFFER
Q203 2SC2712YQB AMP
Q204 DTC144EK ATF GAIN SW
X201 8.86MHz
Q110 DTA124EK AMP
Q111 DTC143EK LED DRIVE
Q112 PMW1 EOT DET.
Q113 PMW1 BOT DET.
IC203 CXA1112M
MATRIX
LEVEL SHIFT
LIMIT
BRAKE
HALL POWER
FWD/RVS
REF. V
IC202 CX20115A
LEVEL SHIFT
REF.V
Q205 2SA1213 PWM DRIVE
Q206 1M1B TORQUE UP SW
Q207 2SA1213 PWM DRIVE
Q208 DTC114EK AMP
IC104 TA7735F
LOGIC
Q118 2SB1121ST LOAD ON
Q119 2SB1121ST UNLOAD ON
D103 1SS184
IC201 CX20114
CONSTANT CURRENT
ROTATION DIRECTION
BRAKE
START
CL DET
POSITION SIGNAL PROCESS
OVER CURRENT DET
POWER OFF
OSC
Q210 2SA1162YQ STARTER
CN106
S-REEL LED (-)
S5SV
S-REEL FG
MODE 3
MODE 2
MODE 1
GND
CASSETTE DOWN
S5SV
EOT SENS.
NC
NC
NC
TO MECHA CHASSIS
CN108
GND
NC
NC
SAFETY TAB
TAPE SENS. LED
S5SV
BOT SENS.
S5SV
T-REEL FG
S5SV
T-REEL LED(-)
TO MECHA CHASSIS
CN103
GND
DEW
TO DEW SENSOR
CN203
W-
W+
V
U-
U+
H+
V-
V+
GND
U
W
C-FG 1
C-FG 2
S5SV
GND
TO CAPSTAN MOTOR
CN202
D-FG
D-PG
COM
GND
TO DRUM MOTOR
CN102
LOAD MTR (-)
LOAD MTR (+)
TO LOADING MOTOR
CN201
U
V
COM
W
TO DRUM MOTOR
UNREG 6V
S5SV
IC103
IC105
IC106
IC102
IC101
IC204
IC104
IC203
IC202
IC201

© CANON INC. 1989

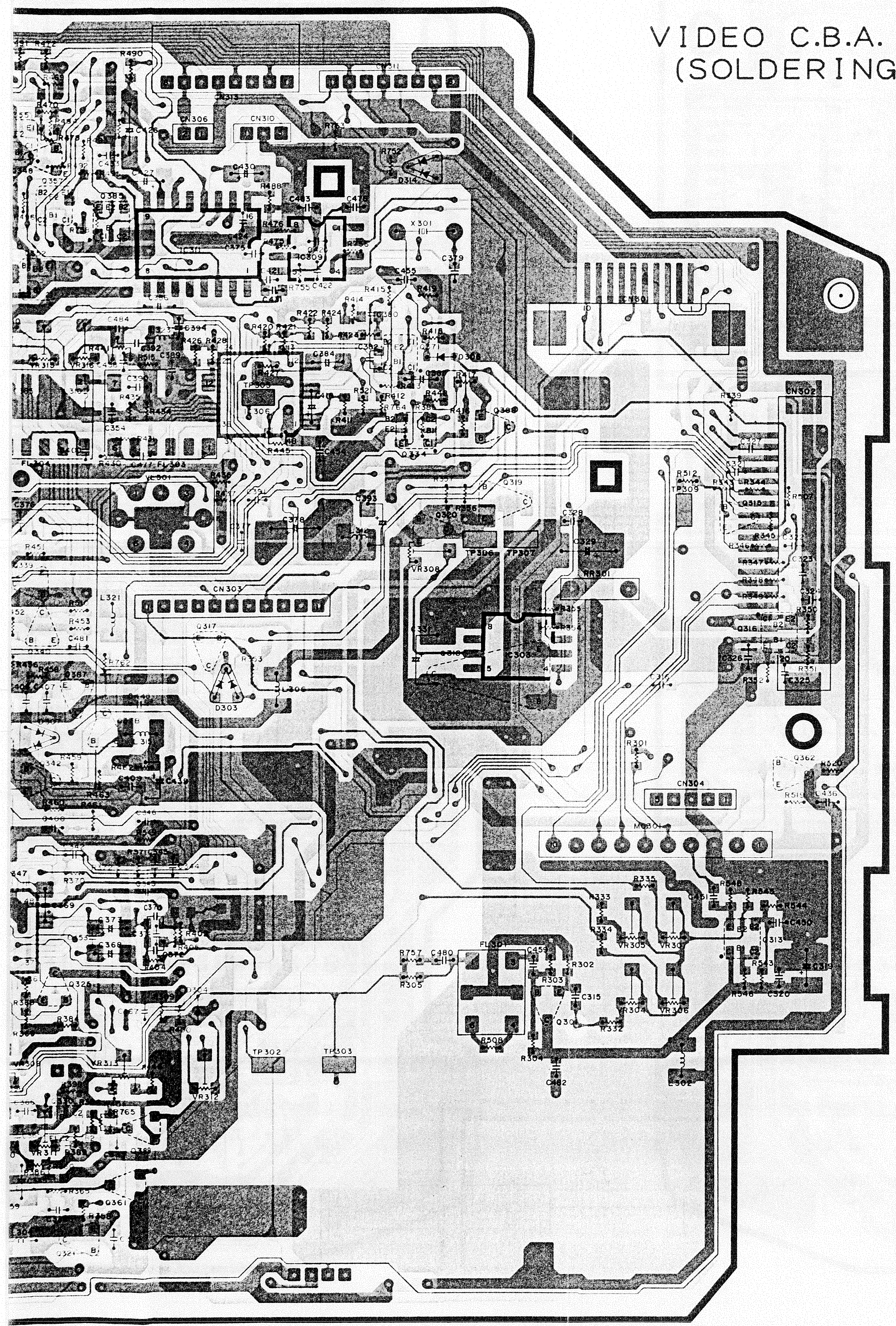
CIRCUIT BOARD DIAGRAM VIDEO C.B.A.

VIDEO C.B.A.
(COMPONENT SIDE)

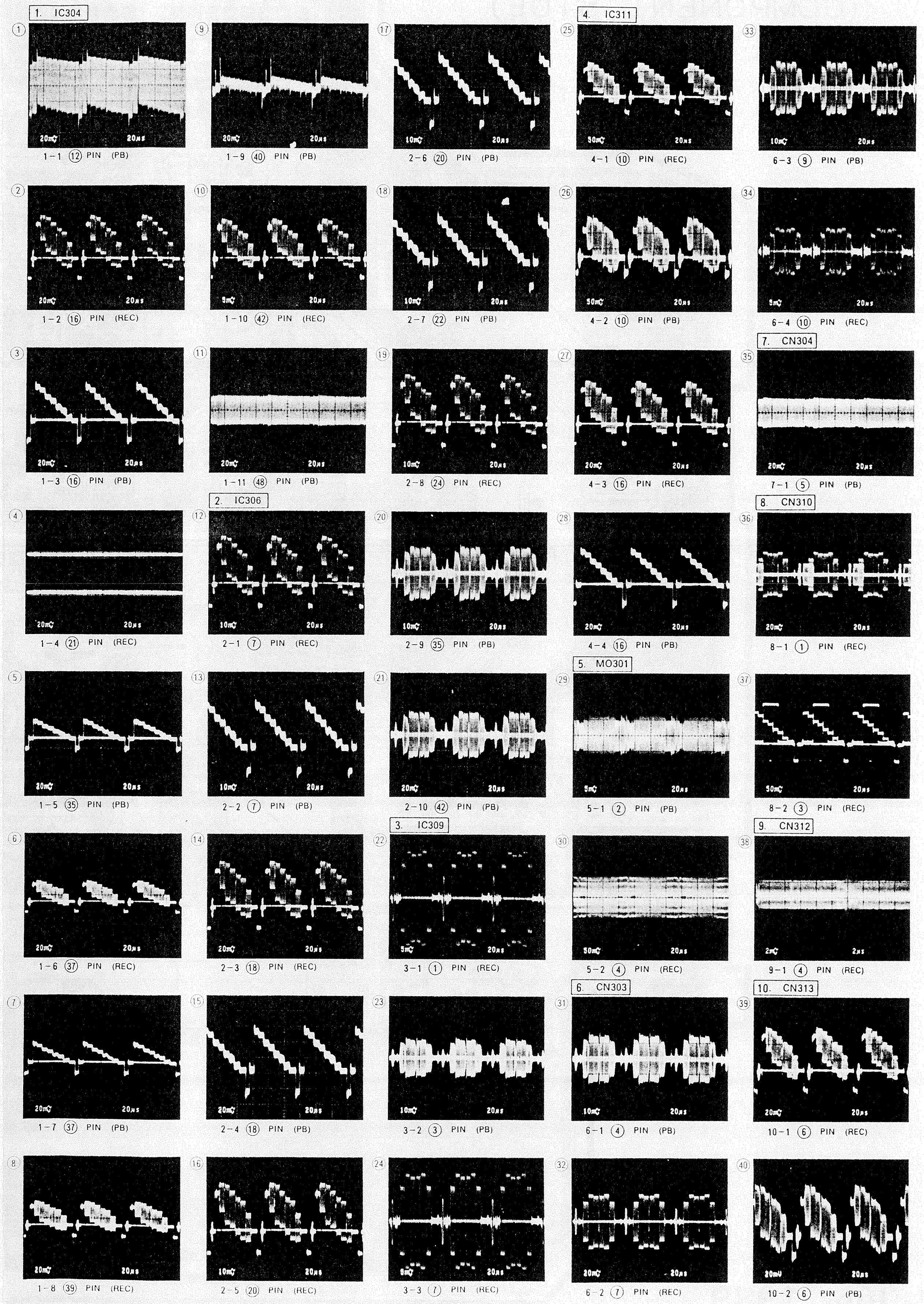

CN313
CN310
CN306
VC301
IC307
IC311
CN301
CN312
FL303
FL304
CN303
CN304
CN305
IC301
FL302
TP302
TP303
L302
D303
VR301
VR305
VR306
VR309
VR310
VR311
VR313
VR315
VR316


VC301
CN312
CN305
DL301

VIDEO C.B.A.
(SOLDERING SIDE)


CN306
CN310
X301
CN301
CN502
CN303
CN304
MO301
TP302
TP303
TP304
TP305
TP307
VR305
VR306
VR307
VR308
FL301
L301
L321
D303
Q317
Q319
Q362
R301
R302
R303
R304
R305
R333
R335
R757
C315
C480
C482

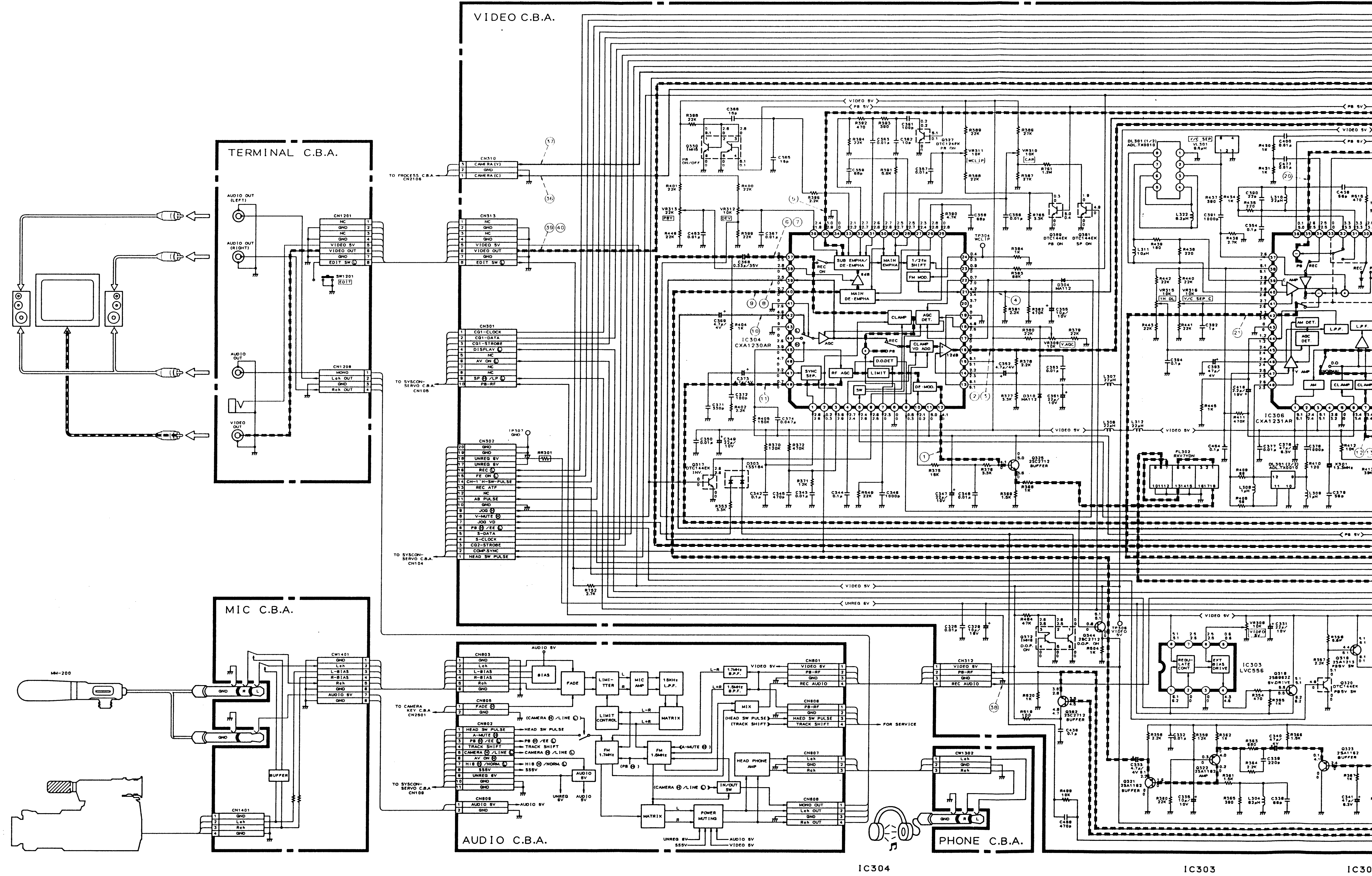
SIGNAL WAVE



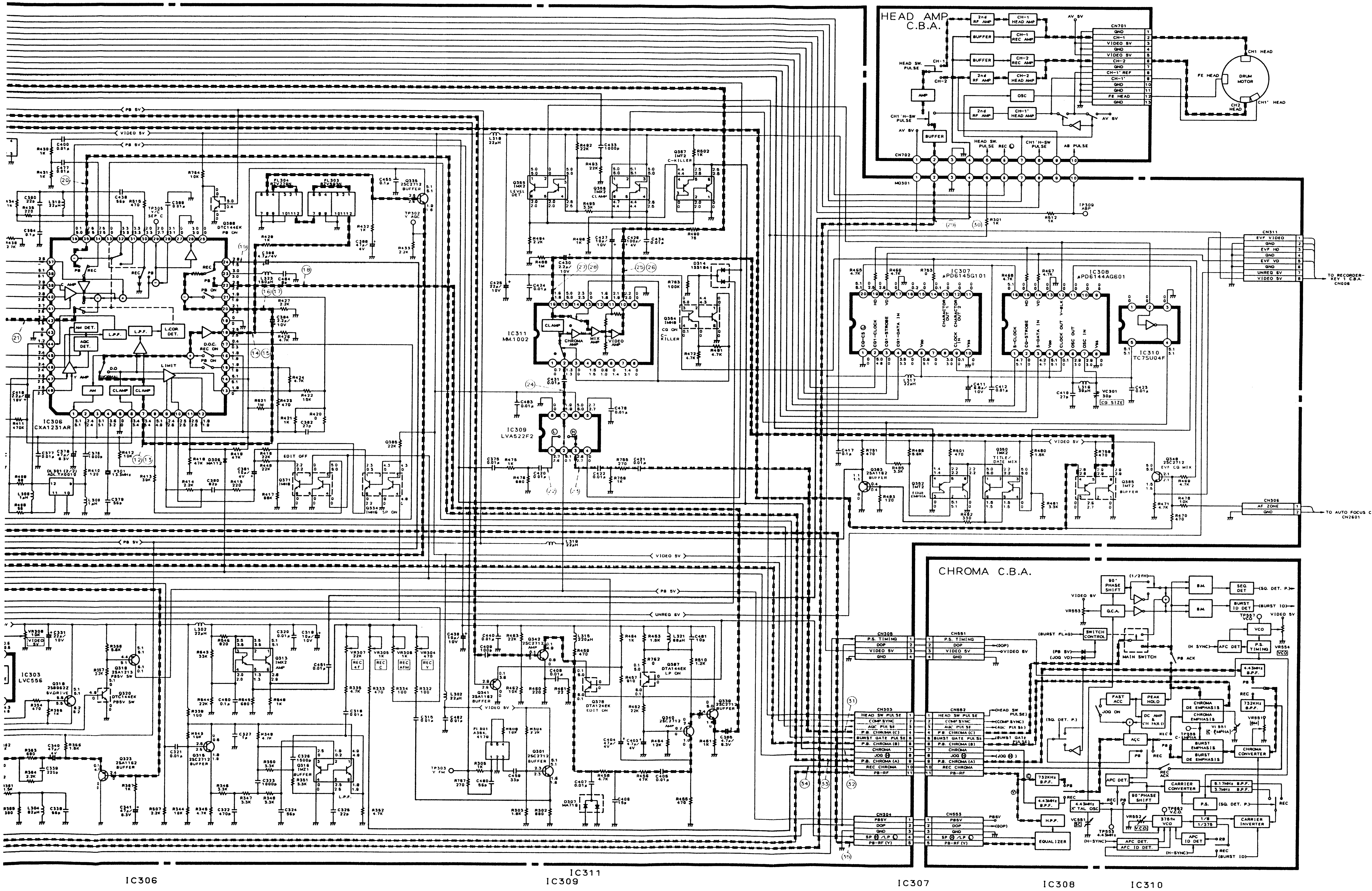
© CANON INC. 1989

SCHEMATIC DIAGRAM VIDEO C.B.A.

•SIGNAL PATH
REC Y+C SIGNAL (GRAY) — REC Y SIGNAL (BLUE) — REC C SIGNAL (ORANGE)
PB Y+C SIGNAL (GRAY) — PB Y SIGNAL (BLUE) — PB C SIGNAL (ORANGE)


VIDEO C.B.A.
TERMINAL C.B.A.
MIC C.B.A.
AUDIO C.B.A.
PHONE C.B.A.
TO PROCESS C.B.A. CN2106
TO SYSCON-SERVO C.B.A. CN105
TO SYSCON-SERVO C.B.A. CN104
TO CAMERA KEY C.B.A. CN2601
TO SYSCON-SERVO C.B.A. CN108
FOR SERVICE
MM-200
IC304 CXA1230AR
IC306 CXA1231AR
IC303 LVC556
IC304
IC303
IC30

01 Jun. 1989


HEAD AMP C.B.A.
2nd RF AMP
CH-1 HEAD AMP
BUFFER
CH-1 REC AMP
CH-2 REC AMP
CH-2 HEAD AMP
OSC
CH-1' HEAD AMP
AMP
HEAD SW. PULSE
CH1'H-SW PULSE
AV 5V
CN701
GND
CH-1
VIDEO 5V
CH-2
CH-1' REF
CH-1'
FE HEAD
CH1 HEAD
FE HEAD
DRUM MOTOR
CH2 HEAD
CH1' HEAD
CN702
MO301
AB PULSE
TP309 ABP
PB 5V
VIDEO 5V
UNREG 5V
IC306 CXA1231AR
IC311 MM1002
CLAMP
CHROMA AMP
MIX AMP
VIDEO AMP
IC309 LVA522F2
IC307 μPD6145G101
IC308 μPD6144AG601
IC310 TC7SU04F
CG SIZE
CN311
EVF VIDEO
EVF HD
EVF VD
UNREG 5V
TO RECORDER-KEY 1 C.B.A. CN008
CN306
AF ZONE
TO AUTO FOCUS C.B.A. CN2601
Q385 IMX2 LEVEL DET
Q386 IMX2 CLAMP
Q387 IMT2 C-KILLER
Q383 2SA1162 BUFFER
Q382 IMT2 EDGE EMPHA
Q380 IMX2 TITLE/DATE MIX
Q385 IMT2 BUFFER
Q348 2SC2712 EVF CG MIX
IC303 LVC556
X301 13.5MHz
DL301
EDIT OFF
SP ON
CHROMA C.B.A.
90° PHASE SHIFT
G.C.A.
B.M.
SEQ. DET
BURST ID DET
VCO
AFC DET
P.S. TIMING
SWITCH CONTROL
MAIN SWITCH
FAST ACC
PEAK HOLD
DC AMP & CH HOLD
ACC
CHROMA DE EMPHASIS
CHROMA EMPHASIS
BURST EMPHASIS
BURST DE EMPHASIS
CHROMA CONVERTER
732KHz B.P.F.
4.43MHz B.P.F.
APC DET.
CARRIER CONVERTER
5.17MHz B.P.F.
3.7MHz B.P.F.
90°PHASE SHIFT
4.43MHz X'TAL OSC
H.P.F.
EQUALIZER
378fH VCO
1/8
1/378
P.S.
CARRIER INVERTER
APC ID DET
AFC DET.
AFC ID DET.
CN305
CN551
P.S. TIMING
DOP
CN303
CN552
HEAD SW PULSE
COMP SYNC
AGC PUL SE
P.B. CHROMA (C)
BURST GATE PULSE
P.B. CHROMA (B)
CHROMA
JOG
P.B. CHROMA (A)
REC CHROMA
PB-RF
CN304
CN553
PB5V
SP/LP
PB-RF (Y)
IC306
IC311
IC309
IC307
IC308
IC310

© CANON INC. 1989

CIRCUIT BOARD DIAGRAM E

EVF C.B.A.

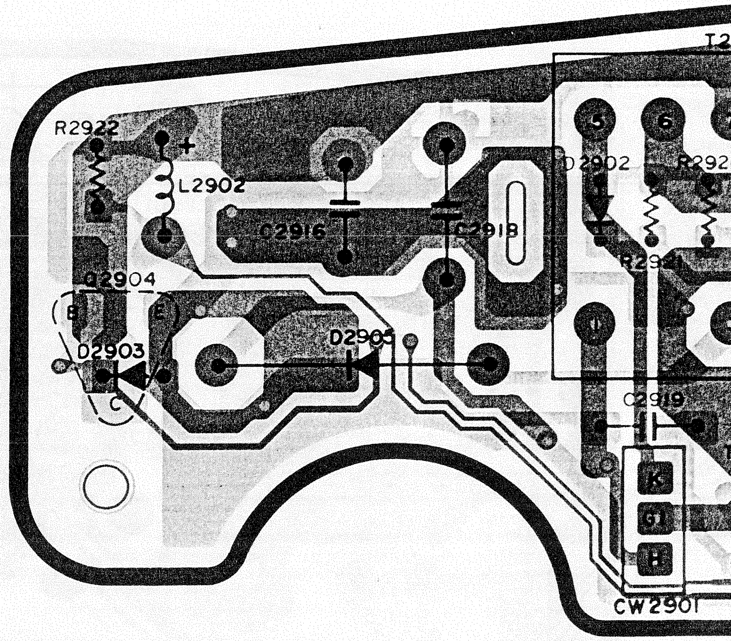
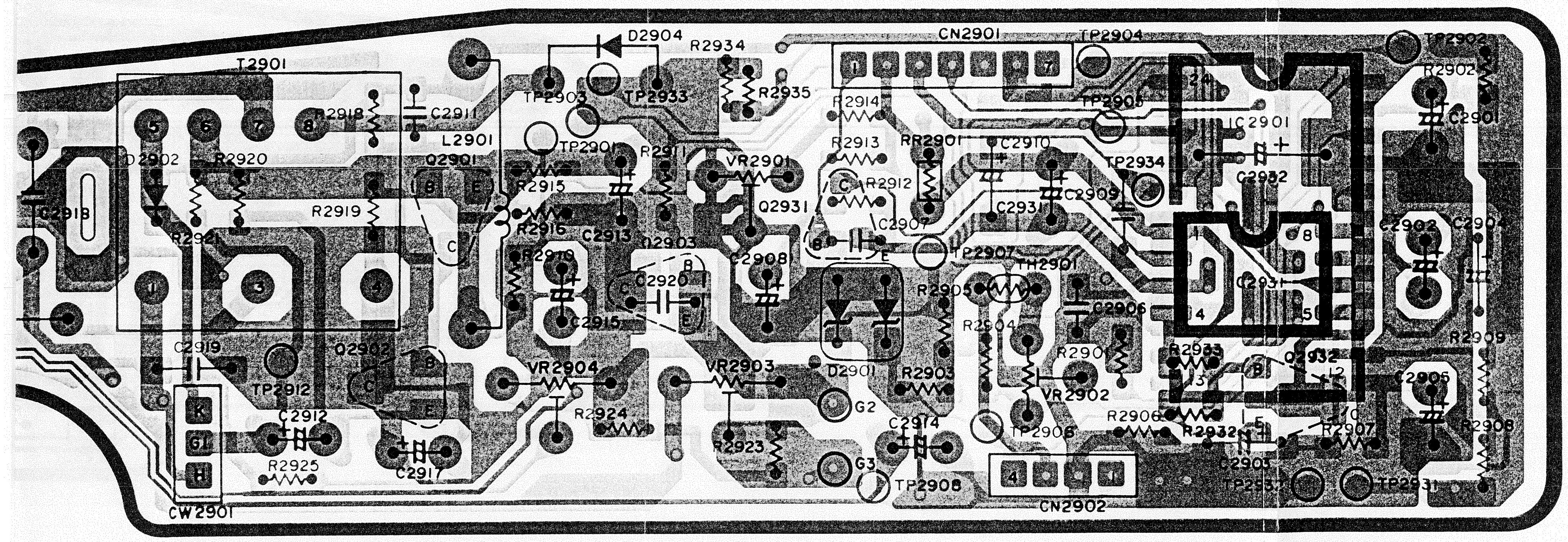

T2
R2922
L2902
C2916
C2918
D2902
R292
R29
Q2904
B
E
D2903
C
D2905
C2919
CW2901

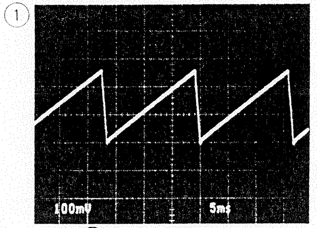
DIAGRAM EVF C.B.A.


T2901
D2904
R2934
CN2901
TP2904
TP2902
R2918
C2911
TP2903
TP2933
R2935
R2914
TP2905
R2902
D2902
R2920
L2901
TP2901
R2911
R2913
RR2901
C2910
IC2901
C2901
Q2901
VR2901
R2912
TP2934
C2932
C2918
R2919
R2915
Q2931
C2931
C2909
R2921
R2916
C2913
Q2903
C2907
C2902
C2904
R2917
C2920
C2908
TP2907
TH2901
Q2931
C2915
R2905
C2906
R2904
C2919
Q2902
VR2904
VR2903
D2901
R2903
R2933
R2901
Q2932
R2909
TP2912
C2912
R2924
G2
VR2902
C2905
K
G1
H
C2914
R2906
R2932
R2907
R2908
R2925
C2917
R2923
G3
TP2906
C2903
CW2901
TP2908
CN2902
TP2932
TP2931

SIGNAL WAVE

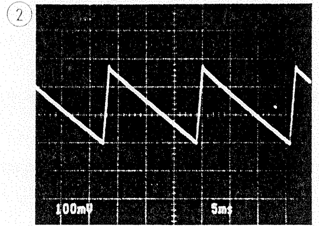
1. IC2901

①



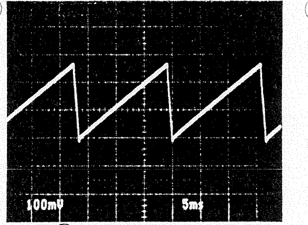
1-1 ① PIN (REC)

②



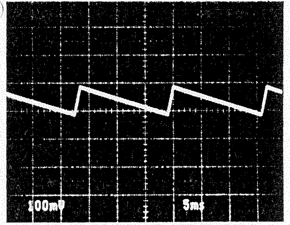
1-2 ③ PIN (REC)

③



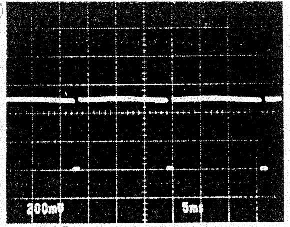
1-3 ⑤ PIN (REC)

④



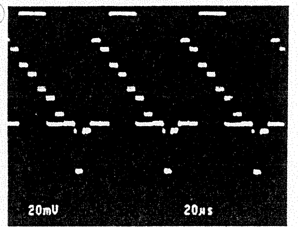
1-4 ⑩ PIN (REC)

⑤



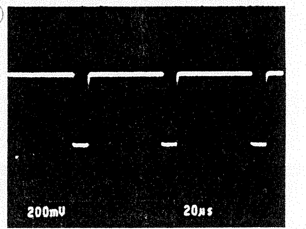
1-5 ⑬ PIN (REC)

⑥



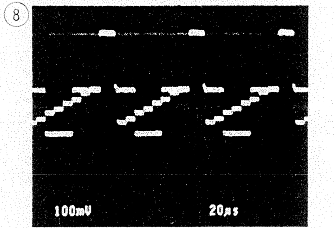
1-6 ⑱ PIN (REC, COLOR BAR)

⑦



1-7 ㉒ PIN (REC)

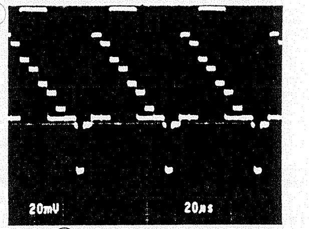
⑧



1-8 ㉔ PIN (REC, COLOR BAR)

2. CW2901

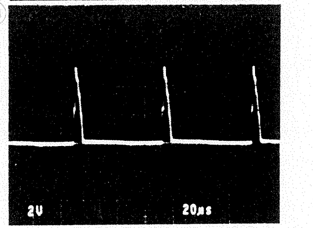
⑨



2-1 ① PIN (REC, COLOR BER)

3. CN2902

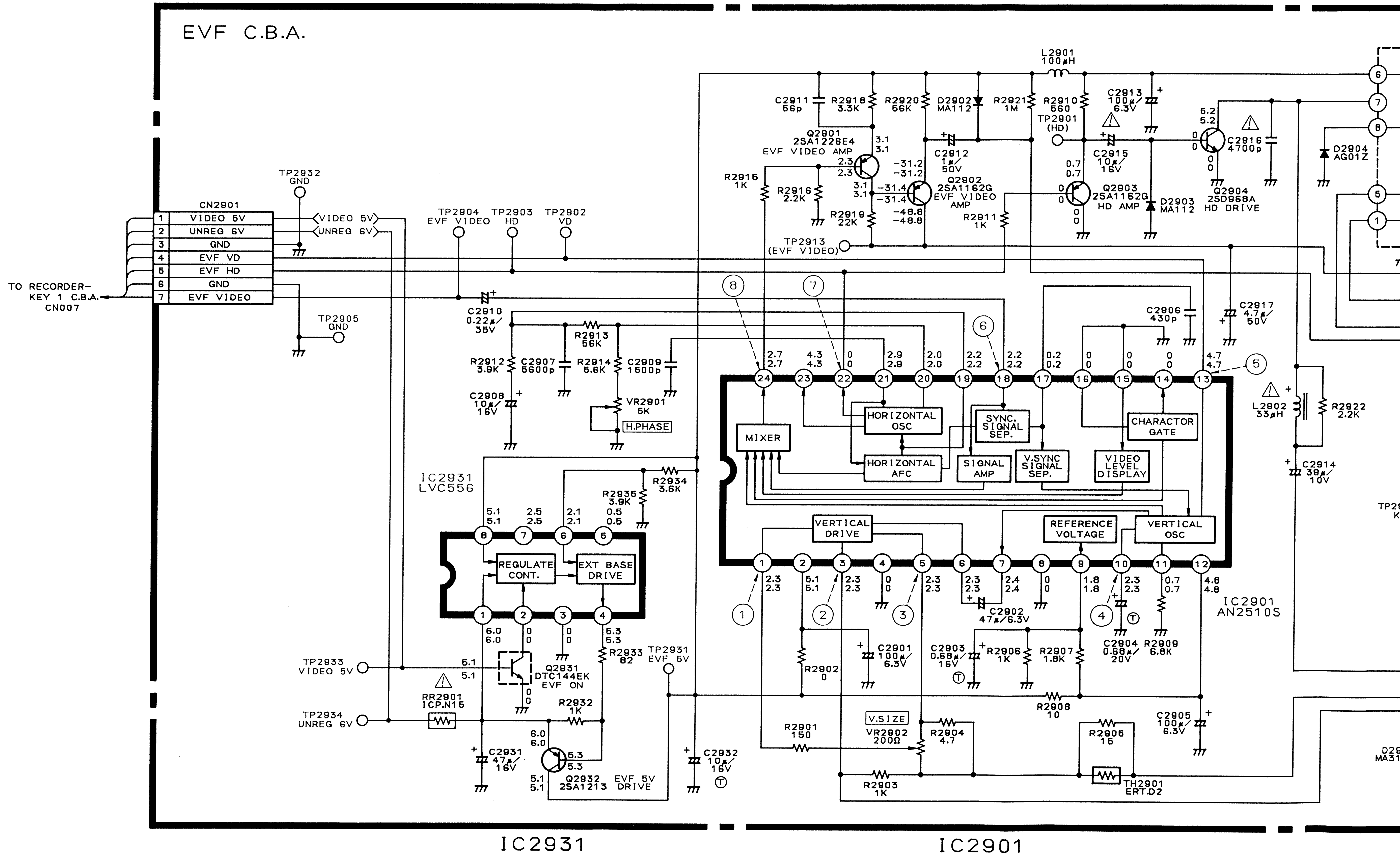
⑩

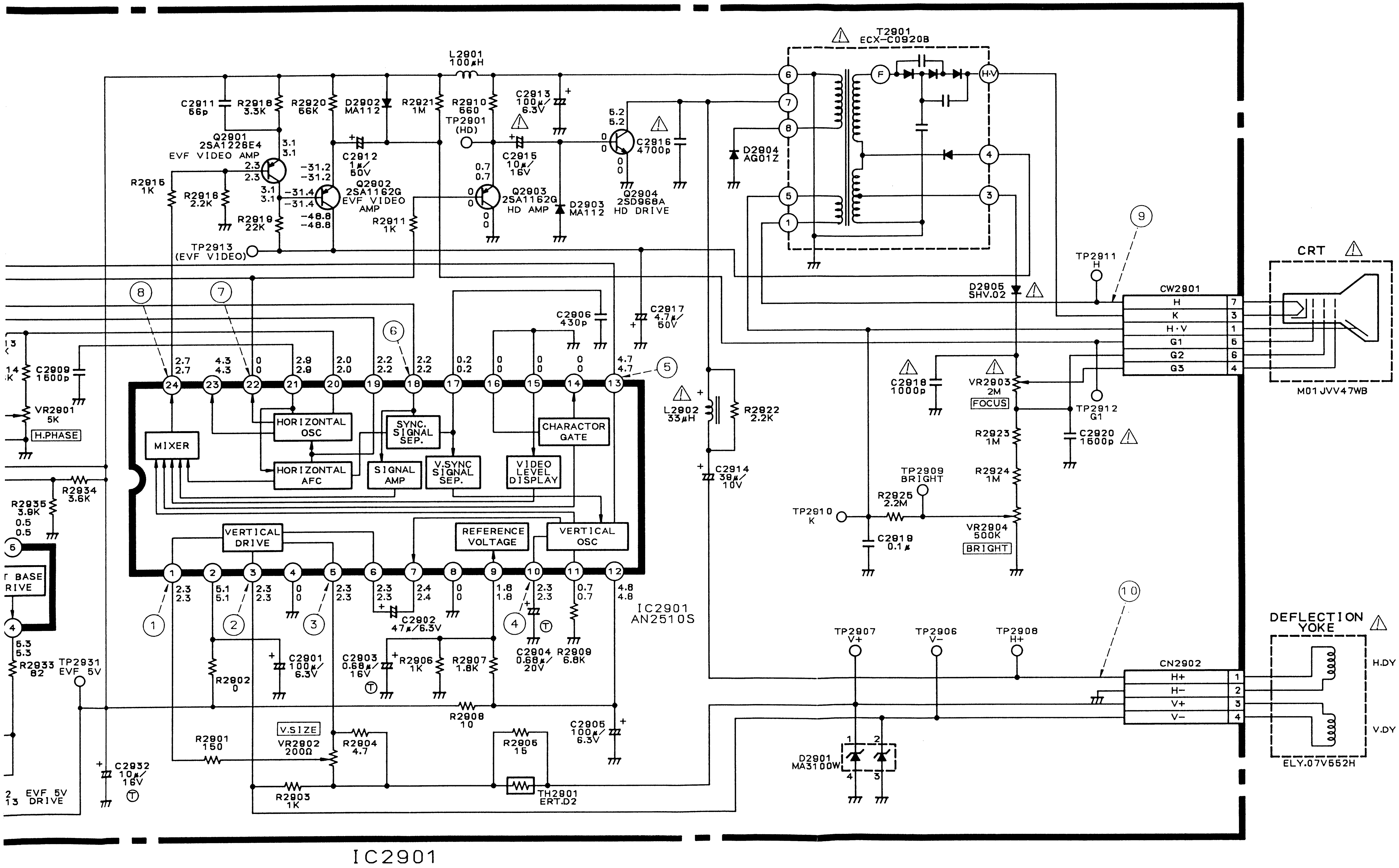


3-1 ① PIN (REC)

© CANON INC. 1989

SCHEMATIC DIAGRAM EVF C.B.A.


EVF C.B.A.
TO RECORDER-KEY 1 C.B.A. CN007
CN2901
1 VIDEO 5V
2 UNREG 6V
3 GND
4 EVF VD
5 EVF HD
6 GND
7 EVF VIDEO
TP2932 GND
TP2905 GND
TP2904 EVF VIDEO
TP2903 HD
TP2902 VD
TP2913 (EVF VIDEO)
TP2901 (HD)
TP2933 VIDEO 5V
TP2934 UNREG 6V
TP2931 EVF 5V
C2910 0.22μ/35V
R2912 3.9K
C2907 6600p
R2913 56K
R2914 6.6K
C2909 1500p
VR2901 5K H.PHASE
C2908 10μ/16V
C2911 56p
R2918 3.3K
R2920 56K
D2902 MA112
R2921 1M
R2910 560
L2901 100μH
C2913 100μ/6.3V
Q2901 2SA1226E4 EVF VIDEO AMP
Q2902 2SA1162G EVF VIDEO AMP
Q2903 2SA1162G HD AMP
Q2904 2SD968A HD DRIVE
C2912 1μ/50V
C2915 10μ/16V
C2916 4700p
D2903 MA112
D2904 AG01Z
R2915 1K
R2916 2.2K
R2919 22K
R2911 1K
C2906 430p
C2917 4.7μ/50V
L2902 33μH
R2922 2.2K
C2914 39μ/10V
IC2901 AN2510S
MIXER
HORIZONTAL OSC
HORIZONTAL AFC
SYNC. SIGNAL SEP.
SIGNAL AMP
V.SYNC SIGNAL SEP.
VIDEO LEVEL DISPLAY
CHARACTOR GATE
VERTICAL DRIVE
REFERENCE VOLTAGE
VERTICAL OSC
C2901 100μ/6.3V
R2902 0
C2902 47μ/6.3V
C2903 0.68μ/16V
R2906 1K
R2907 1.8K
C2904 0.68μ/20V
R2909 6.8K
R2908 10
C2905 100μ/6.3V
R2901 150
V.SIZE VR2902 200Ω
R2904 4.7
R2905 15
R2903 1K
TH2901 ERT.D2
IC2931 LVC556
REGULATE CONT.
EXT BASE DRIVE
R2935 3.9K
R2934 3.6K
R2933 82
Q2931 DTC144EK EVF ON
RR2901 ICP.N15
R2932 1K
C2931 47μ/16V
Q2932 2SA1213 EVF 5V DRIVE
C2932 10μ/16V
IC2931
IC2901


T2901
ECX-C0920B
L2901
100μH
C2911
56p
R2918
3.3K
R2920
56K
D2902
MA112
R2921
1M
R2910
560
C2913
100μ
6.3V
TP2901
(HD)
Q2901
2SA1226E4
EVF VIDEO AMP
R2915
1K
R2916
2.2K
R2919
22K
C2912
1μ
50V
Q2902
2SA1162G
EVF VIDEO AMP
R2911
1K
C2915
10μ
16V
Q2903
2SA1162G
HD AMP
D2903
MA112
C2916
4700p
Q2904
2SD968A
HD DRIVE
D2904
AG01Z
TP2913
(EVF VIDEO)
D2905
SHV.02
TP2911
H
CW2901
H
K
H·V
G1
G2
G3
CRT
M01JVV47WB
C2906
430p
C2917
4.7μ
50V
C2909
1600p
VR2901
5K
H.PHASE
R2934
3.6K
R2935
3.9K
T BASE
RIVE
R2933
82
TP2931
EVF 5V
C2932
10μ
16V
EVF 5V
DRIVE
MIXER
HORIZONTAL OSC
HORIZONTAL AFC
SYNC. SIGNAL SEP.
SIGNAL AMP
V.SYNC SIGNAL SEP.
VIDEO LEVEL DISPLAY
CHARACTOR GATE
VERTICAL DRIVE
REFERENCE VOLTAGE
VERTICAL OSC
IC2901
AN2510S
L2902
33μH
R2922
2.2K
C2914
33μ
10V
C2918
1000p
VR2903
2M
FOCUS
TP2912
G1
C2920
1600p
R2923
1M
R2924
1M
TP2909
BRIGHT
R2925
2.2M
TP2910
K
C2919
0.1μ
VR2904
500K
BRIGHT
C2902
47μ/6.3V
C2901
100μ
6.3V
R2902
0
C2903
0.68μ
16V
R2906
1K
R2907
1.8K
C2904
0.68μ
20V
R2909
6.8K
R2908
10
C2905
100μ
6.3V
R2901
150
V.SIZE
VR2902
200Ω
R2904
4.7
R2906
15
R2903
1K
TH2901
ERT.D2
TP2907
V+
TP2906
V−
TP2908
H+
D2901
MA3100W
CN2902
H+
H−
V+
V−
DEFLECTION YOKE
H.DY
V.DY
ELY.07V552H
IC2901

© CANON INC. 1989

Supplement

During the production, some adjustments, part Nos., descriptions in the Service Manual were revised. The all revisions have been informed on the Service Manual Reports periodically, and this Supplement is composed of them.

SERVICE MANUAL REPORT INDEX

SMR NO.	DATE	MODEL	NO. TITLE
AD-356P.S.	'89. 7	A1E/F	1. Classification No. 2. Ground Wire Deletion (R-KEY(1) C.B.A.) 3. Camera Adjustment Rating Revision 4. Parts Control Information
AD-362P.S	'89. 8	A1E/F	1. Resistor Addition (PROCESS C.B.A.) 2. Capacitor Addition (PROCESS C.B.A.) 3. Focusing Ring Change 4. Classification No. Change 5. Ratings for Switching Point Adjustment Change 6. Parts Control Information
AD-363N.P.S	'89. 8	A1E/F	1. Type No. of Clock IC Change 2. Parts Control Information
AD-374P.S	'89.11	A1E/F	1. Mic Jack C.B.A. Change 2. Adjustment Plate Deletion 3. Zoom Motor/Zoom Lens Ass'y.s Change 4. UL Tape Addition (Terminal C.B.A.) 5. Power Zoom Switch C.B.A./Connector Additions 6. Screw Deletion (Camera Holder) 7. Screw Change (EVF Section) 8. Focus Lens Ass'y. Change 9. Parts Control Information
AD-381 P.S	'89.12	A1E/F	1. Parts Catalog Correction 2. Service Manual Report Correction (AD-356P.S) 3. Process C.B.A. Change 4. Audio C.B.A. Change 5. Parts Control Information
AD-386P.S	'90. 1	A1E/F	1. Servo Microcomputer Change 2. Service anual Report Correction (AD-374P.S) 3. Parts Control Information

SMR NO.	DATE	MODEL	NO. TITLE
AD-408N.P.S	'90. 7	MC-4B	1. Drive Gear Change 2. Parts Control Information
AD-422N.P F-PAL	'90. 9	MC-4B MC-4C	1. New Service Part Addition 2. Coaster, Right Change 3. Parts Control Information
AD-432P F-PAL	'90.10	MC-4B	1. Remedy for Reel Motor Error
AD-441N.P. F-PAL	'90.11	MC-4B	1. New Service Parts 2. Parts Control Information
AD-454P F-PAL	'90.12	A1E/F A1HiE/F	1. Addition of White Balance Sensor Window 2. Parts Control Information

2-2 Classification : Changed during ␣␣00.

2-3 Interchangeability : Possible

2-4 Repair Information : These shield plate and ground wire are not established as service parts.

3. Camera Adjustment Rating Revision

3-1 Revision

To reduce an orange tint excessively appeared when shooting at the subject with high luminance, the ratings for camera adjustment have been revised as follows.
The new Process C.B.A. (DG1-0636-000) only are stocked.
R2230 (VR5-6790-182) is established as a service part.

	Affected Adj. Items	Old	New
1	4-8 Y level (SPEC.)	1200 ±40mV	1100 ±40mV
2	4-14 Color balance	R 1.6 ±0.1 times Ye 1.1 ±0.2 times G 1.0 ±0.2 times	R 1.4 ±0.2 times Ye 1.0 ±0.25 times
3	Knee point R2314	1.6K	1.8K (VR5-6970-182)
4	AGC effective area R2230	Center-emphasis + averaging 47K	Center-emphasis Deleted

3-2 Classification : Informed later.

3-3 Repair Information

To remove an orange tint, perform the above measures from 1 through 4 as a set.

4. Parts Control Information

4-1 Deleted parts : N/A

4-2 Changed parts : N/A

4-3 New Service Part :

PART No.	CLASS	Q'ty.	DESCRIPTION
VR5-6970-182 000	C	1	RESISTOR, 1.8KΩ 1/16W

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD356P·S 1/2

Date July 20, 1989

Canon A1E, F

PAL

SECAM

1. Classification No.
2. Ground Wire Deletion (R-KEY(1) C.B.A.)
3. Camera Adjustment Rating Revision
4. Parts Control Information

1. Classification No.

The classification No. of the product mentioned in the title are stamped as follows.

85 03 00001

00001 — Serial No.
03 — Classification No. (from 03)
85 — Year/Month manufactured (*)

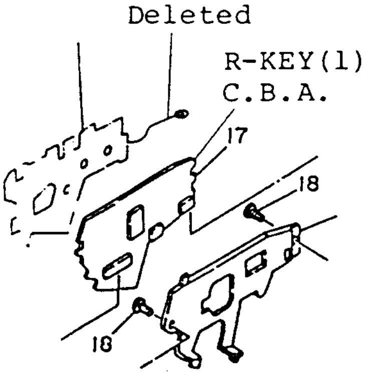
*

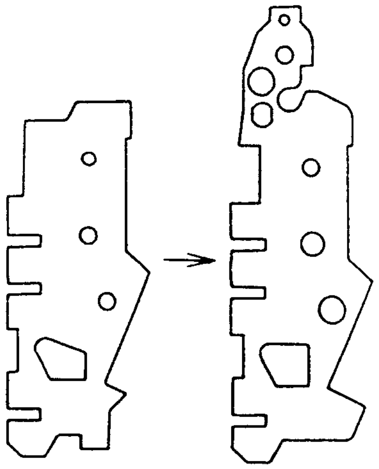
Month / Year	1	2	3	4	5	6	7	8	9	10	11	12
89					85	86	87	88	89	90	91	92
90	01	02	03	04	05	06	07	08	09	10	11	12
91	21	22	23	24	..	..	..					
⋮												

2. Ground Wire Deletion (R-KEY(1) C.B.A.)

2-1 Deletion

For cost efficiency, a ground wire from R-KEY(1) C.B.A. shield plate has been deleted. Instead of it, a screw (No. 18 in the figure) is added.




(Old) (New)

2-2 Classification : Changed from 01.

2-3 Interchangeability : Possible.

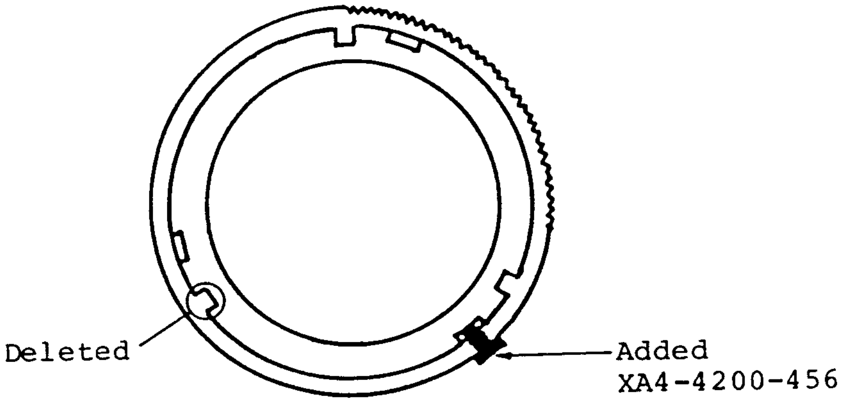
2-4 Repair Information

To reduce the diagonal beat pattern, perform the above change. (Solder C2188 on R2166.)

3. Focusing Ring Change

3-1 Change

For more reliability against shock, a claw of focusing ring indicated in the figure has been deleted. Instead of it, a screw (DY1-7105-000) is added.
The new Focus Lens Ass'y. (DY1-7105-000) only are stocked.



3-2 Classification : Changed from 02.

4. Classification No. Change

4-1 Change

The classification No. for Camera Adjustment Rating Revision (AD-356P·S) has been established as follows.

- Classification : Changed from 02.

5. Ratings for Switching Point Adjustment Change.

5-1 Change

To improve colour bleeding in still mode, the ratings for switching point adjustment had been changed.
The new ratings have been already specified on the repair instruction.

5-2 Classification : Not changed (Changed during 00.)

5-3 Repair Information

To improve the colour bleeding in still mode, perform the switching point adjustment as specified on the repair instruction.

Canon *VIDEO* SERVICE MANUAL REPORT

©

Technical Service Department, Canon Inc.

Report No. AD-362P·S 1/3

Date August 20, 1989

Canon A1E/F

PAL

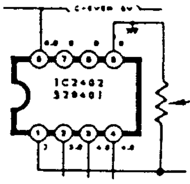
SECAM

1. Resistor Addition (PROCESS C.B.A.)
2. Capacitor Addition (PROCESS C.B.A.)
3. Focusing Ring Change
4. Classification No. Change
5. Ratings for Switching Point Adjustment Change
6. Parts Control Information

1. Resistor Addition (PROCESS C.B.A.)

1-1 Addition

For more reliability in performance of E^2PROM (IC402), R2489 (9.1KΩ) has been added as follows.
The new PROCESS C.B.A. (DG1-0816) only are stocked.


IC2402
378401

Added
R2489 9.1KΩ (lead type)
VR5-2290-912-000

1-2 Classification : Changed from 01.

1-3 Repair Information :

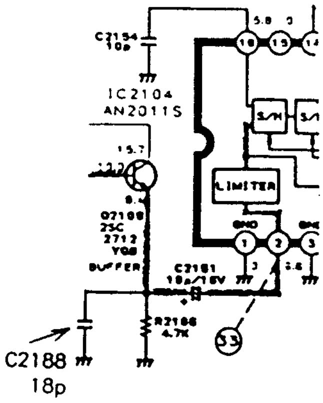
When repairing E^2PROM presetting, perform the following measures.

1. Add R2489 (9.1KΩ).
2. Readjust 4-6 Full Auto White Balance adjustment.

2. Capacitor Addition (PROCESS C.B.A.)

2-1 Addition

To reduce the diagonal beat pattern, C2188 18pF is added as shown below.
The new PROCESS C.B.A. only is stocked C2188 18pF (VW4-1234-180) is established as a new service part.


C2154
10p
IC2104
AN2011S
15.7
Q2100
2SC
2712
YGB
BUFFER
LIMITER
S/H
GND
C2181
10µ/16V
R2186
4.7K
53
C2188
18p

5

Canon ©
VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD-363N•P•S 1/1
Date August 20, 1989

NTSC
PAL
SECAM

Type No. of CLOCK IC change

1. Change
2. Parts Control Information

1. Change

For consolidation, type No. of clock ICs have been changed.
(NTSC: 360,000 pixels, PAL/SECAM: 420,000 pixels)

Model	Old	New
A1A H460A E440A	MN5124 (DH4-0187-000) for NTSC only	MH5139 (DH4-0245-000) for NTSC/PAL/SECAM
A1E,F H660A E640A	MN5138 (DH4-0244-000) for NTST/PAL/SECAM	

2. Parts Control Information

As the performance of ICs are the same, the old type only are stocked.

6. Parts Control Information.

6-1 Deleted parts : N/A

6-2 Changed parts : DG1-0816-000 New only stocked.
DY1-7105-000 New only stocked.

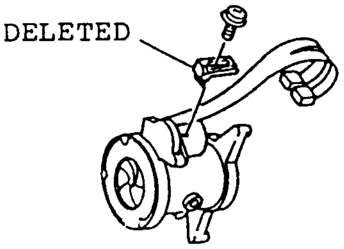
6-3 New Service parts

PART NO.	CLASS	Q'TY.	DESCRIPTION
VR5-2290-912-000	C	1	RESISTOR 9.1KΩ 1/5W
VW5-1234-180-000	C	1	CAPACITOR, CERA, 18pF 50V

2. Adjustment Plate Deletion

2-1 Deletion

For cost efficiency, the adjustment plate (DA7-1699-001) of lens section is deleted.



2-2 Classification : Not changed (Changed during 04).

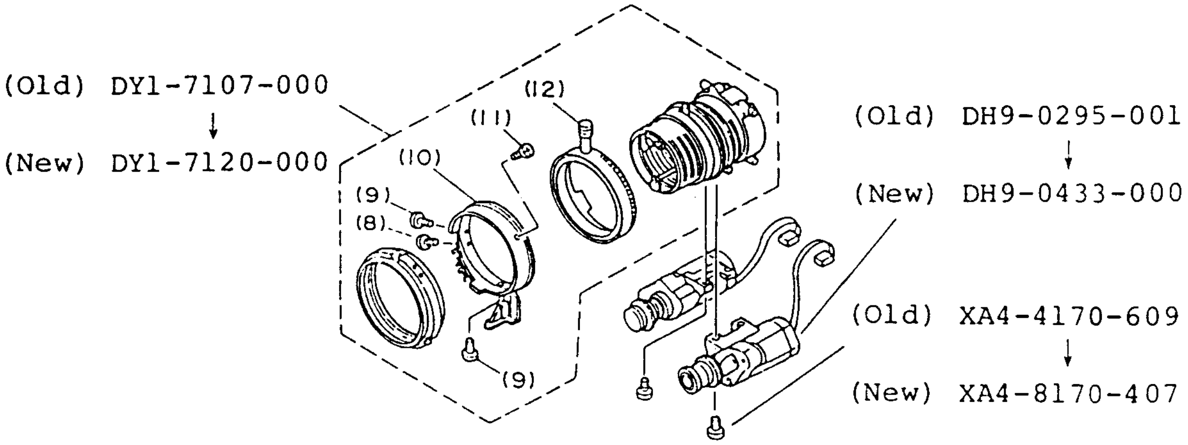
2-3 Repair Information :

The lens section adjustments are not changed. DA7-1699-001 will be deleted from the parts list after the stock is depleted.

3. Zoom Motor/Zoom Lens Ass'y.s Change

3-1 Change

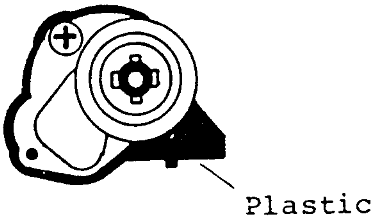
For cost efficiency, the Zoom Motor/Zoom Lens Ass'y.s and the screws are changed.



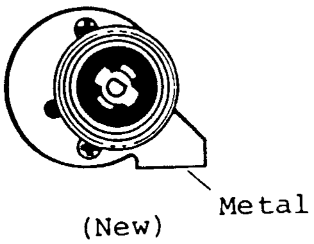
(Old) DY1-7107-000
↓
(New) DY1-7120-000

(Old) DH9-0295-001
↓
(New) DH9-0433-000

(Old) XA4-4170-609
↓
(New) XA4-8170-407



(Old)



(New)

Canon ©

VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No.AD-374P.S 1/6

Date November 20, 1989

Canon A1E/F

PAL

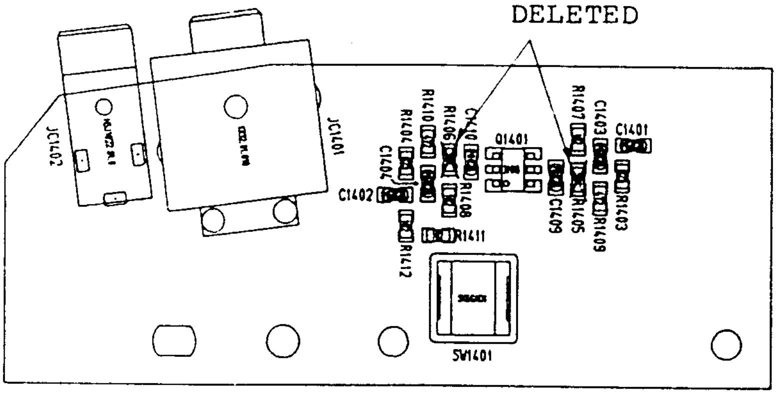
SECAM

1. Mic Jack C.B.A. Change
2. Adjustment Plate Deletion
3. Zoom Motor/Zoom Lens Ass'y.s Change
4. UL Tape Addition (Terminal C.B.A.)
5. Power Zoom Switch C.B.A./Connector Additions
6. Screw Deletion (Camera Holder)
7. Screw Change (EVF Section)
8. Focus Lens Ass'y. Change
9. Parts Control Information

1. Mic Jack C.B.A. Change

1-1 Change

To reduce mic noise, R1405 and 1406 are deleted.


DELETED
JC1402
JC1401
R1410
R1404
R1406
C1410
C1404
C1402
R1408
R1411
R1412
Q1401
R1407
C1403
C1401
C1409
R1405
R1409
R1403
SW1401

1-2 Classification : Not changed.

1-3 Repair Information :

To reduce mic noise, remove R1405 and 1406.
The new Mic Jack C.B.A. (DY1-1072-000) only are stocked.

4-2 Classification : Not changed

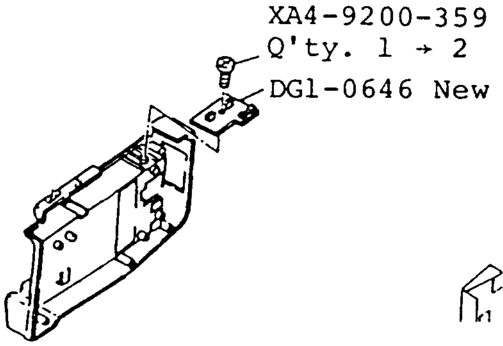
4-3 Repair Information

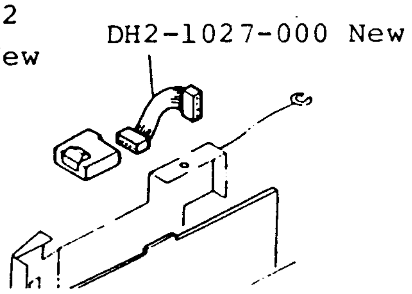
Any adhesive tapes commercially obtainable can be used.

5. Power Zoom Switch C.B.A./Connector Addition

5-1 Addition

For servicing efficiency, a Power Zoom Switch C.B.A. and a connector are added.

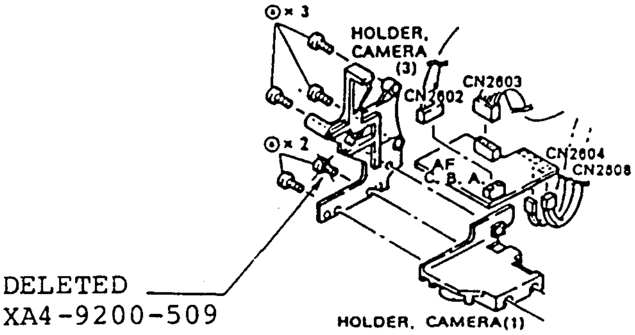

XA4-9200-359
Q'ty. 1 → 2
DG1-0646 New


DH2-1027-000 New

6. Screw Deletion (Camera Holder)

6-1 Deletion

For cost efficiency, a screw of camera holder is deleted as follows.


⊙× 3
HOLDER, CAMERA (3)
CN2602
CN2603
⊙× 2
AF C. B. A.
CN2604
CN2608
DELETED
XA4-9200-509
HOLDER, CAMERA(1)

6-2 Classification : Not changed.

3-2 Classification : Not changed (Changed during 04).

3-3 Interchangeability : Impossible

For the interchangeabilities, refer to the following table.

Zoom Lens Ass'y. Zoom Motor Ass'y.	Old	New	Screw
Old	o	×	XA4-4170-609
New	×	o	XA4-8170-407

o : Interchangeable

× : Not interchangeable

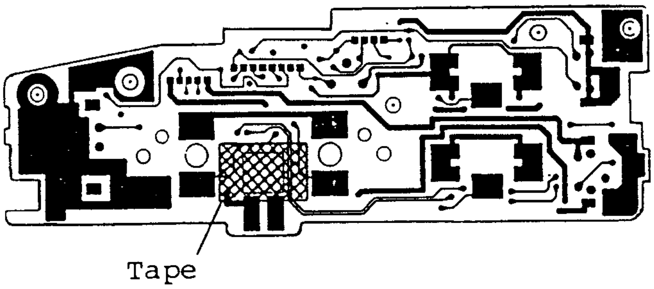
3-4 Repair Information

The new and the old Zoom Motor/Lens Ass'y.s and the screws are stocked.

4. UL Tape Addition (Terminal C.B.A.)

4-1 Addition

To prevent a 5 V power supply terminal cap (reverse side of Pin Jack Ass'y.) from dropping off, a UL standardized tape is added as follows.



9. Parts Control Information

9-1 Deleted parts : N/A

9-2 Changed parts :

DA7-1699-001	Deleted after old stock depletion.
DG7-0818-000	New only added after old stock depletion.
DY1-1072-000	New only stocked.
DY1-7105-000	Deleted after old stock depletion.
XA4-4170-609	Q'ty. changed from 4 to 2.
XA4-9200-359	Q'ty. Changed from 1 to 2.

9-3 New service parts :

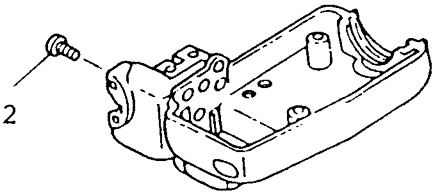
PART No.	CLASS	Q'TY.	DESCRIPTION
DG1-0646-000 000	C	1	POWER ZOOM SW C.B.A.
DG9-3405-000 000	C	1	FOCUS LENS ASS'Y.
DH2-1027-000 000	C	1	CONNECTOR
DH9-0433-000 000	C	1	PZ MOTOR ASS'Y.
DY1-7120-000 000	C	1	ZOOM LENS ASS'Y.
XA4-8170-407 000	F	2	SCREW CROSS-RECESS FCH
XA9-0480-000 000	F	2	SCREW CROSS-RECESS PH

7. Screw Change (EVF Section)

7-1 Change

For more reliability, a length of screw (EVF Section) has been changed.

Old		New
12 mm	→	14 mm



New
XA4-0480-000 × 2

7-2 Classification : Not changed

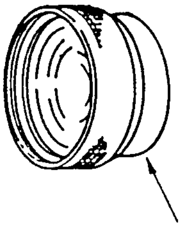
7-3 Repair Information :

To repair the rattling/loosening of EVF rotating section, replace a screw with the new one.

8. Focus Lens Ass'y. Change

8-1 Change

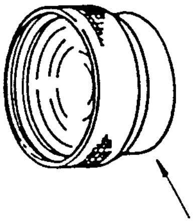
For cost efficiency, the Focus Lens Ass'y. has been changed. The old type (DY1-7105-000) will be deleted after the stock depletion.



Spacer attached inside.

Old

(DY1-7105-000)



Spacer is not attached inside.

Changed

(DG9-3405-000)

8-2 Classification : Not changed

8-3 Interchangeability : Possible

3-2 Classification : Not changed.

3-3 Interchangeability : Possible

3-4 Repair Information :

The new Process C.B.A. (DG1-0816-000) only are added after the old stock depleted.

4. Audio C.B.A. Change

4-1 Change

To improve characteristics of audio (stereo microphone) input/output, the Audio C.B.A. has been modified in two steps as follows.

* The modification ③ is only performed for service parts stocked.

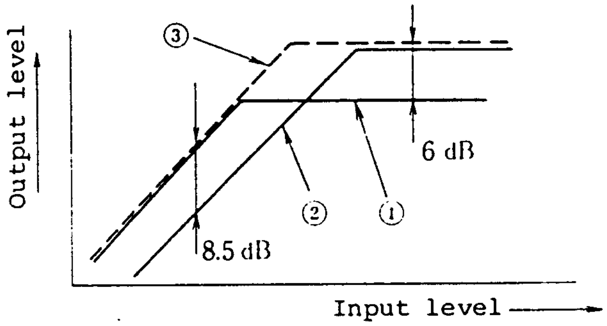


Fig. 1 Input/Output Characteristics

- First Modification : ① → ②

1) To enhance a sound quality, the input/output characteristics is decreased by 8.5 dB.*
2) Dynamic range is increased by 6 dB.*
3) Attack recovery time is increased by three times.*

*1) R923 100 kΩ → 18 kΩ (VR5-7750-183-000)
R924 100 kΩ → 18 kΩ (VR5-7750-183-000)
R928 100 kΩ → 18 kΩ (VR5-7750-183-000)

*2) R861 100 kΩ → 47 kΩ (VR5-7750-473-000)
R862 100 kΩ → 47 kΩ (VR5-7750-473-000)

*3) R929 47 KΩ → 10 KΩ (VR5-7750-103-000)
C963 22 μF/6.3 V → 47 μF/4 V (VC6-5380-476-000)

- Second Modification : ② → ③

1) To increase an input level, the input/output characteristics is increased by 8.5 dB.*

*1) R923 18 kΩ → 47 kΩ (VR5-7750-473-000)
R924 18 kΩ → 47 kΩ (VR5-7750-473-000)
R928 18 kΩ → 47 kΩ (VR5-7750-473-000)

Canon VIDEO SERVICE MANUAL REPORT
©
Technical Service Department, Canon Inc.

Report No. AD-381P·S 1/4

Date December 20, 1989

Canon A1E, F

PAL

SECAM

1. Parts Catalog Correction
2. Service Manual Report Correction (AD-356P·S)
3. Process C.B.A. Change
4. Audio C.B.A. Change
5. Parts Control Information

1. Parts Catalog Correction

1-1 Correction

A part No. of EVF C.B.A. has been corrected.

Error		Corrected
DY1-1075-000	→	DY1-1091-000

2. Service Manual Report Correction (AD-356P·S)

2-1 Correction

A classification No. informed in AD-356P·S has been corrected.

	Error		Corrected
Classification No. :	(from 03)	→	(from 00)

3. Process C.B.A. Change

3-1 Change

For reliability, a Process C.B.A. has been changed as follows.

	Old	New
R2314	1.8 kΩ	1.6 kΩ
R2385	39 kΩ	100 kΩ
R2386	1.5 kΩ	Deleted

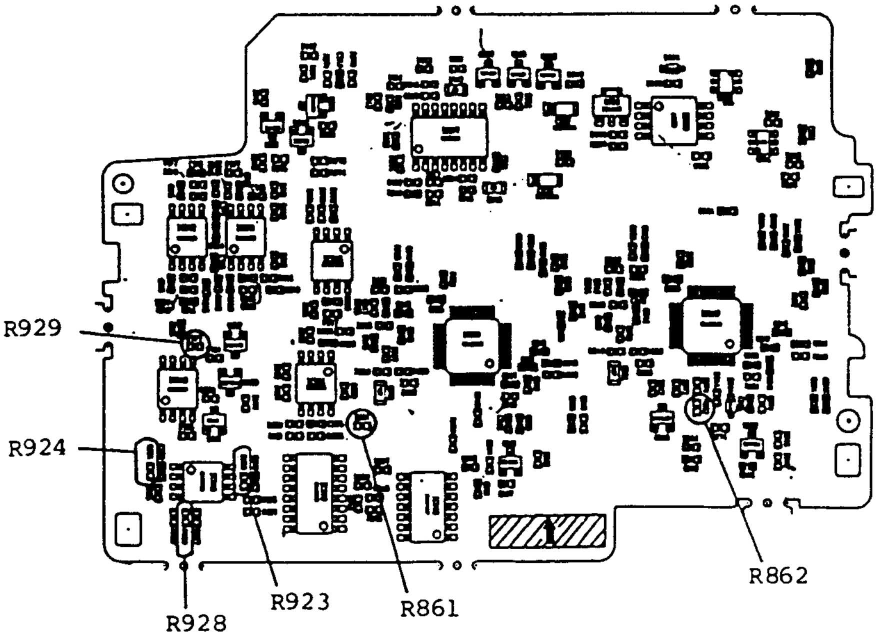


Fig. 3 Audio C.B.A. (Soldering side)

5. Parts Control Information :

5-1 Deleted part : N/A

5-2 Changed parts :

DG1-0812-000	New only stocked.
DG1-0816-000	New only added after old stock depletion.
DY1-1075-000	Deleted from parts catalog.
DY1-1091-000	Added to parts catalog.

5-3 New service parts :

PART NO.	CLASS	Q'TY.	DESCRIPTION
VC5-5380-476-000	C	1	CAPACITOR, ELECT. 47 µF/4 V
VR5-7750-103-000	C	1	RESISTOR 10 kΩ 1/16 W
VR5-7750-183-000	C	3	RESISTOR 18 kΩ 1/16 W
VR5-7750-473-000	C	5	RESISTOR 47 kΩ 1/16 W

4-2 Classification : Changed from 03.

4-3 Repair Information :

The purpose and feature of modification are shown in the figure 1.

① Initial production level

② Sound quality enhanced

③ Input level increased

When repairing, perform modification of ② or ③ by replacing capacitors, resistors or C.B.A. (③).
(The adjustment is not required)

As service parts, the Audio C.B.A. ③ only are provided.

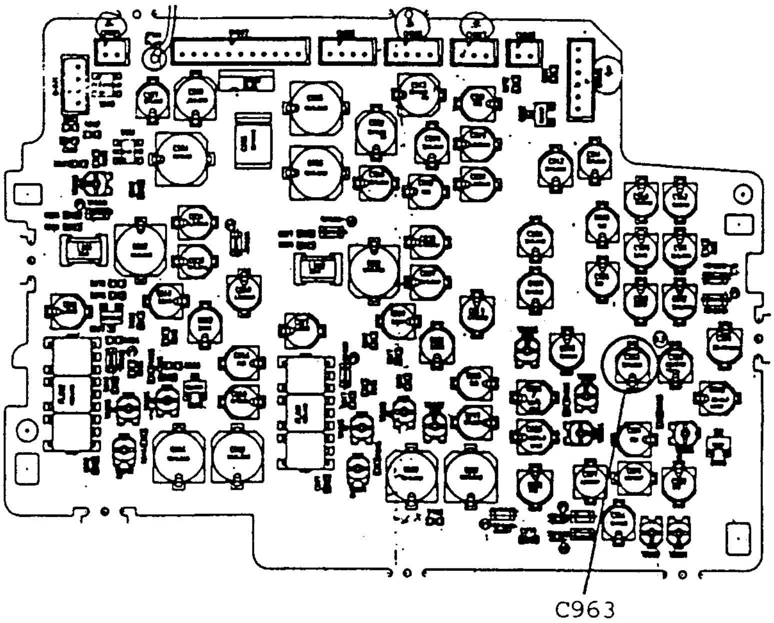


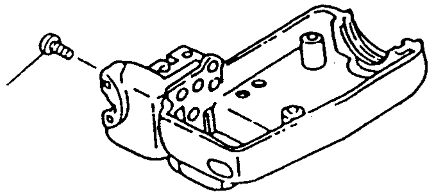
Fig. 2 Audio C.B.A. (Component side)

2. Service Manual Report Correction (AD-374P·S)

2-1 Correction

The part No. in "7. Screw Change (EVF Section)" has been corrected as follows.

Error
XA4-0480-000 × 2
↓
Corrected
XA9-0480-000 × 2



3. Parts Control Information

3-1 Deleted parts : N/A

3-2	Changed parts :	DG1-0809-000	New only stocked.
		DH4-0194-000	New only stocked.

3-3 New Service Parts : N/A

Canon VIDEO SERVICE MANUAL REPORT
©
Technical Service Department, Canon Inc.

Report No. AD-386P·S 1/2

Date January 20, 1990

Canon A1E, F

1. Servo Microcomputer Change
2. Service Manual Report Correction (AD-374P·S)
3. Parts Control Information

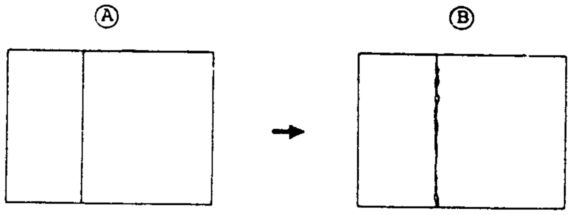
PAL

SECAM

1. Servo Microcomputer Change

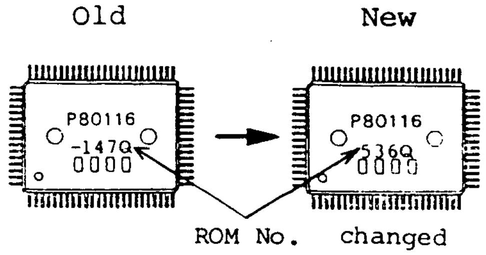
1-1 Change

To improve a jitter performance in recording/playback mode at low temperatures a servo microcomputer IC101 (DH4-0194-000) has been changed. (With this change, the ROM No. is changed.)



No jitter

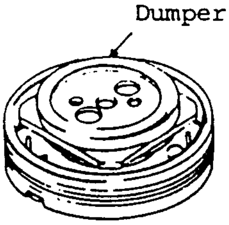
Jitter spread
(Jitter line doubled)



* As the production was discontinued, the stock only is changed.

1-2 Repair Information

To solve the above symptom, replace the IC101 or the Syscon Servo C.B.A. (If the dumper is installed, remove it when the IC or the C.B.A. is replaced.)



When the tape which is recorded with the product before replacement is playbacked, the jitter performance becomes worse than the above symptom.

Canon ©
VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD－422N·P·F－PAL 1/2
Date September,20,1990

Canon MC－4B,MC－4C

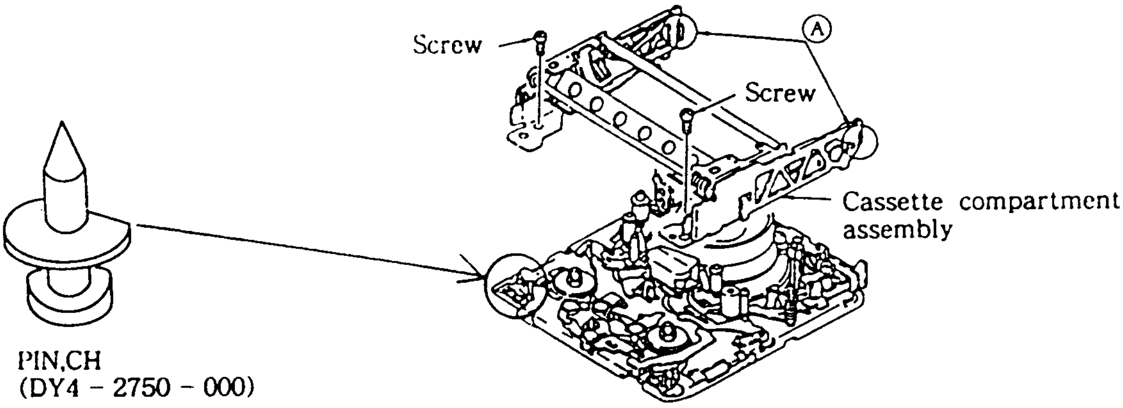
1. New Service Part Addition
2. Coaster, Right Change
3. Parts Control Information

NTSC
PAL
F-PAL

1. New Service Part Addition

1－1 Addition

The following positioning pin is added as a new service part for a cassette housing (S－side).



1－2 Repair information

·How to use the positionig pin

1) Dismount the C.B.A.S and cassettecompartment.

2) Cut off “”>——< ” indicated part (three points) in the figure.

3) Face the cut—off part toward a side of loading motor.
Then, push it until it touches the depression of mechanical chassis completely. (Fig.b)

Canon ©
VIDEO SERVICE MANUAL REPORT
Technical Service Department, Canon Inc.

Report No. AD-408N·P·S
1/1
Date July 20, 1990

Canon MC-4B

NTSC
PAL
F·PAL

1. Drive Gear Change
2. Parts Control Information

1. Drive Gear Change

1-1 Change

From the H800 series, the MC-4C has been mounted instead of the MC-4B. With this change, the following parts are changed. (consolidated with the parts for the MC-4C)

Old		New
DY4-2667 (White)	→	DY4-2742 (Yellow)
DY4-2668 (Blue)	→	DY4-2743 (Green)

1-2 Classification : N/A

1-3 Interchangeability :

- For the MC-4B, both types (old and new) can be used.
- For the MC-4C, the new type only can be used.

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts :

DY4-2667	Deleted after old stock depleted.
DY4-2668	Deleted after old stock depleted.

2-3 New Service Parts

PART NO.	CLASS	Q'TY.	DESCRIPTION
DY4-2742-000 000	C	1	GEAR
DY4-2743-000 000	C	1	GEAR

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD – 432P·F – PAL
1/1

Date October 20,1990

Canon MC – 4B

PAL

F-PAL

·Remedy for Reel Motor Error

Due to the variation of mechanism loading and the driving system of loading motor, the loading motor may be sometimes driven forward and backward repeatedly at ejecting. To repair this, perform the following measure.

1. Affected models :

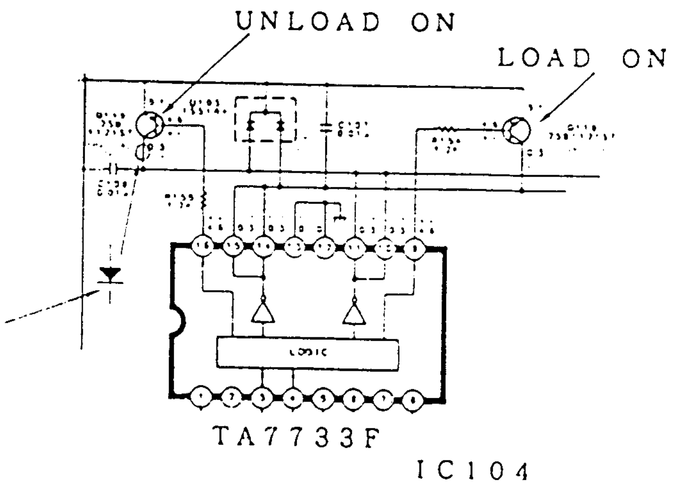
E80E,F E808E,F A1E,F

*Remarks : From the A1HiE,F, the MC – 4C has been mounted instead of the MC – 4B. The symptom will not occur because the MC – 4C adopts the pulse driving method.

3. Remedy

Check the MC – 4B of above symptom (Not – ejectable) if its loading motor moves forward and backward repeatedly, by repeating loading/unloading without the tape.

If the symptom occurs, add a diode to the connector of transistor (which turned on at unloading) to decrease the driving voltage at unloading. (Cut a pattern partly.)



Y22 – 2052 – 000 is added.

4) Confirm the position of it, and secure with the Alonalpha or equivalent. (Fig.c)

5) Check the tape transport.

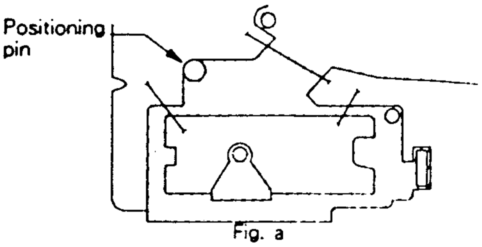


Fig. a

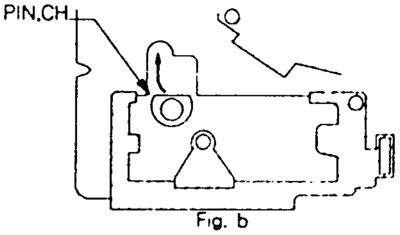


Fig. b

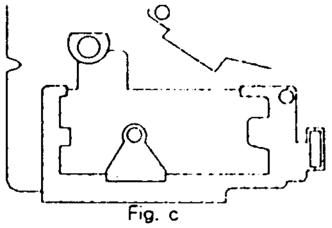


Fig. c

3.Parts Control Information

3－1 Deleted/Changed parts: N/A

3－2 New service part

PART No.	CLASS	Q'TY	DESCRIPTION
DY4－2750－000	C	1	PIN, CH

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-1 New service parts :

PART NO.	CLASS	Q'TY.	DESCRIPTION
DY4-2956-000	C	1	SCREW
DY4-2957-000	C	1	BASE, DRUM
DY4-2958-000	C	1	BASE, DRUM

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD-441N・P・F-PAL
1/2
Date November 20, 1990

Canon MC-4B

NTSC
PAL
F-PAL

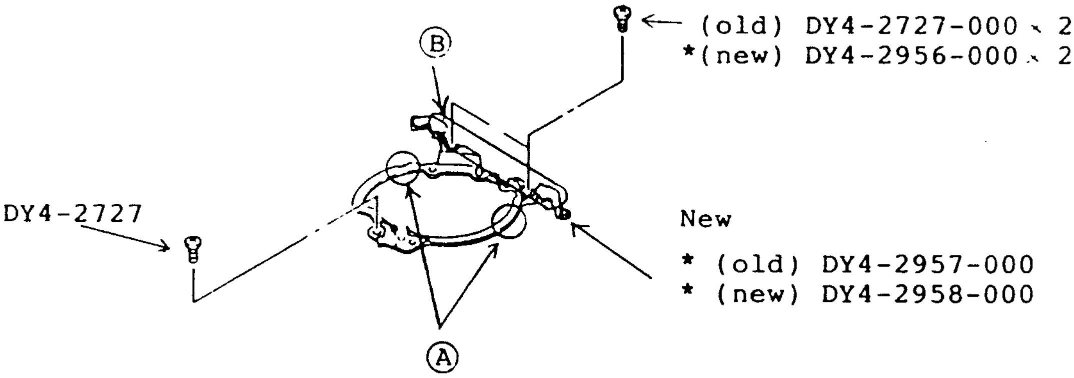
1. New Service Parts
2. Parts Control Information

1. New Service Parts

1-1 Addition

For the market request, two types (old and new) of drum base and a screw for the new type have been established as new service parts.

* indicated parts are newly established.



Remarks for the new type drum base :

Ⓐ parts are convex to match with the concave parts of mechanical chassis.
Ⓑ part is thicker than the old type.

1-2 Repair information

The MC-4B which has been manufactured around May, 1989 has the both types (old and new) of drum base, mechanical chassis and screw.
As they do not have an interchangeabilities each other, check the difference of shape when replacing.

Drum Base	Old	New
	↕	↕
Mechanical Chassis	Old	New

2

Canon **VIDEO** SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD-454P·F-PAL
1/1

Date December 20, 1990

Canon A1E/F , A1HiE/F

PAL

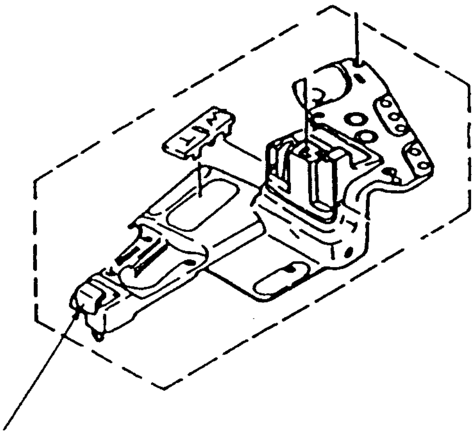
F-PAL

1. Addition of White Balance Sensor Window
2. Parts Control Information

1. Addition of White Balance Sensor Window

1-1 Addition

For the request from the market, the following part has been added.



Added
DA1-2196-000 (WINDOW, WB SENSOR)

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-3 New service part

PART NO.	CLASS	Q'TY.	DESCRIPTION
DA1-2196-000	B	1	WINDOW, WB SENSOR